

# THE SCHOOL REVIEW

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BOARD OF EDITORS OF  
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## *A Statement of Intent*

With this issue, the *School Review* becomes a quarterly. As a quarterly the *School Review* hopes to continue its established role and to play a part in the necessary reconstruction of American education. It will present no blueprint for the school of the future, but, to illuminate the needs of education today and tomorrow and to suggest ways in which educational provisions may be brought abreast of these needs, it will draw upon the work of scholars in many fields and the reflections of those who have thought deeply about the role of education in modern society.

While considerable emphasis will be given to theoretical writings and to research, the description and analysis of promising practices will not be neglected. It is the belief of the Editorial Board of the *School Review* that many of the coming advances in education will result from the resourcefulness of teachers and administrators who contrive imaginative solutions to learning problems and evaluate them through application in the schools. The *School Review* will

make a continuing search for schools and teachers on "the growing edge" and will attempt to help its readers analyze the results of these thrusts into the future.

It will offer its pages to vigorous statements of a variety of positions in the hope that its readers will subject to rigorous scrutiny and criticism the various hypotheses and conclusions presented. To this end it invites thoughtful letters from its readers and will undertake to publish in each issue as many as possible of the most cogent and pungent comments from readers on articles in preceding issues.

The quarterly *School Review* is expected to reflect the newer thinking of the faculty of the Department of Education of the University of Chicago, as the Department proceeds with the strengthening of its own programs in research, teacher education, and services to the field. The *School Review* will reflect also the concern for the improvement of education which is now so evident in other departments of the University. Contributions will be sought, as well, from leaders throughout America and from abroad who are doing constructive thinking about education.

The *School Review* will range over a wide field, considering nothing foreign to it which is relevant to the improvement of education for all age groups. It will look at learning sequences from the primary school through college, while attempting to emphasize the secondary levels; it will consider the relations among the various segments of American education and draw upon experiences in other countries; and it will strive to present research reports, descriptions of innovations, and reflective expositions on topics which are the common concern of all engaged in education for any group.

Among the topics and problems to which the *School Review* will direct attention in this number and in subsequent issues are: educating the gifted, dealing with the emotionally disturbed child, re-examining criteria for the selection of content, revitalizing curriculum sequences in mathematics and sciences, redefining the task of educational administration, focusing research on the learning processes, and resolving the conflicts of values in a changing society.

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## *New Conditions Confront Education*

Within the past forty years man has catapulted himself into a new era through his application of science and technology to the release of energy, the processes of production, the means of transportation, and the mechanics of communication. In the resulting world of magnified power and shrunken space, men of diverse cultures jostle each other with dangerously meager understanding of each other's aspirations or intentions. And the most thoughtful ponder how the new forces unleashed may be turned to man's enhancement rather than becoming the means of his debasement and destruction.

At the same time education, which is the means through which men assimilate the accumulated culture and become children of their own age, tends to remain fixed at the level established by the conditions at the turn of the century. Yet change has been so rapid as to demand within a single generation new concepts of time and distance and a readjustment, if not a reconstruction, of social institutions and values. Analysis of the situation compels a doubt that the schools as now constituted and supported can carry the burden of preparing men to cope with the problems and possibilities of the changes already upon us, much less those now emerging from the laboratories and drawing boards.

Five of the factors which make the task of the schools more exacting than ever before are discussed in the following paragraphs.

The first factor is a tremendous enlargement of the environment to be understood and the culture to be transmitted. No previous gen-

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eration, for example, had such pressing need for geographical knowledge of the whole earth or for an understanding of customs and institutions in many lands. The technical knowledge required of the average citizen has expanded geometrically, and the advancement of science has enlarged enormously the horizons of knowledge. In short, the cultural heritage which young people today need to assimilate is broader and richer than has been set before any previous generation. Moreover, the school's choice of content from the profusion of accumulating knowledge is made more difficult by lack of consensus on values and lack of agreement among scholars on the criteria for choice. We are confronted, therefore, not only with the need for a thoroughgoing examination of the curriculums now offered in our schools, but with the necessity for developing new approaches to the selection of content and the organization of learning experiences.

A second factor is the increasing level of literacy and technical skill required for effective work in industry, government, and the professions. The advance of the American economy is punctuated by the continuing destruction of low-skilled jobs and their replacement by jobs requiring highly developed technical or managerial skills. This process is now being accelerated so that industry will be demanding fewer and fewer routine operators and ever larger numbers of men with the skills to design, build, instal, repair, and control machinery. A high proportion of the new jobs being created require basic understandings and skills in mathematics, science, and the arts of communication. Heavier demands are being made, too, on the ability to plan, to co-ordinate operations, and to exercise independent judgment. These industrial demands for highly literate workers are paralleled in government and the military services. Our scientific and professional occupations now employ more than 5,000,000 persons as compared with just over 1,200,000 in 1900, and the demand is still rising.

A third factor is the need for establishing intercultural communication as a basis for building a world community. There was a time



when acquaintance with the elements entering into Western civilization would entitle one to qualify as an educated citizen of the United States. This is no longer true. The responsibilities of citizenship in our closely knit world demand some knowledge of many cultures. For our own interests, as well as for the sake of our obligations to mankind, we need citizens who can understand how the peoples of other lands have come to terms with their own environments and, in so doing, have developed institutions and systems of values different from ours. Educational agencies in the United States must set themselves a goal of giving our adult citizens and the young people now growing up an understanding of the peoples of Africa, Korea, the Middle East, and other undeveloped lands that will enable our people to help others achieve their own proper aspirations and to choose membership in the free world through the processes of enlightenment and social advance.

A fourth factor is the problem of preparing the individual for effective participation in public policy in an era when bad decisions can so quickly bring calamity. The American dream is centered on the idea of an individual who is free to work out his destiny in his own way and to determine within broad general limits how he will make his particular contribution to society. Not only is man to be free to chart his private course, but the public policy itself is conceived as the resultant of choices freely arrived at by individual members of society. If men are to be free, not only to think their own thoughts and to speak their own minds, but also to shape public policy through decisions individually arrived at, there must be some assurance in our dangerous era that the free choices of individuals will somehow "add up" on the side of wisdom and the general welfare. Our chief guaranty of such an outcome lies in providing for all our citizens a quality of education reserved in most societies for a small elite group.

A fifth factor is the constantly accelerating rate of change, which makes forecasting hazardous and outspeeds the efforts of education to draw abreast of needs. There are persons who talk of predicating

education upon the kinds of conditions which will be met in adult life by members of the rising generation. But we are not wise enough to predict what these conditions will be. Who in 1900 could have predicted the hydrogen bomb, jet planes traveling faster than sound, color television, or the possibility of man-made satellites circling indefinitely in space? The rate of change makes futile any attempt to prepare narrowly for the demands of contemporary or emerging society.

I can see only one way out of this dilemma: to aim for an education that will enable man to abstract from the culture the understandings and skills through which to maintain his equilibrium in a field of rapidly shifting forces. The old argument among those who would have education address itself to immediate social needs and those who would have it beamed at the development of a "liberated" mind is now largely obsolete. The most immediate and pressing demands of our times, when analyzed, turn out to be not those for narrow vocational skills or for easy social adjustment but demands for a depth of understanding which will make it possible to apply the accumulated wisdom of the race to new conditions as they arise.

All that I have been saying supports the notion that there is need for a thoroughgoing reformulation of the content, the method, and the administrative organization of education for all age groups. Fortunately, while the demands on education have increased enormously, the possibility of adapting educational provisions to emerging needs has also expanded greatly. The advances in biology, anthropology, psychology, and other social sciences have given us a new understanding of man and of how he grows and learns. We are also in a much better position than formerly to tap the varied cultural resources of all the peoples of the earth. Consequently the potential resources for the reconstruction of learning experiences and the preparation of teachers are more numerous and diverse than in any previous period. Furthermore, the steady rise in national productivity and income makes possible the support of a vastly improved program of education without imposing any strain on the economy.

The development of education suited to the needs of the last half of the twentieth century will not be an easy task. It will require the combined efforts of the staffs of elementary, secondary, and higher educational institutions, with the active assistance and support of leaders from all walks of life and of citizens generally. The process of redefining our educational objectives and procedures should enlist the best thinking of our generation. The task has many aspects, but four are central.

1. *A thoroughgoing re-examination and revision of the sequences of learning experiences provided in our schools and colleges.* To achieve the necessary reconstruction of education, we must proceed on a broader front than previously and with a wider array of talent than has yet been brought to the task. Experienced teachers who know at firsthand the problems encountered in the education of the young must pool their knowledge with those who have had opportunity to observe and analyze the work of many different teachers in many kinds of situations. The special insights into human behavior of the clinical psychologist must be mingled with the anthropologist's understanding of how culture conditions learning, with the sociologist's perceptions of the complex interaction between the school and the society in which it is rooted, and with the historian's perspective on the growth and decline of institutions and civilizations.

The assistance of able minds from all the organized fields of knowledge must be enlisted in the task of selecting the content most relevant to the exigencies of our times and organizing it into sequences appropriate to the development of human possibilities for free and abundant living. The undertaking will call for sustained study over a period of years by persons who have unusual understanding of the needs for education in our society, the nature of the learning processes, and the growth potentialities of human beings. The staff working on this undertaking should again and again test their formulations with experienced teachers, supervisors, and administrators from elementary and secondary schools and from colleges. As the work progresses, the revised curriculum should be tested carefully—first in laboratory situations where systematic eval-

uation is possible and then in a number of situations with learners of varied backgrounds, abilities, and interests.

In view of the great demands being made on the schools, special attention will have to be given to the development of strong sequences in mathematics, the sciences, the arts of communication, and other phases of the curriculum where weaknesses are now apparent. We must also consider how to provide learning experiences that are directed toward helping members of our society acquire an understanding of the ways in which peoples in other lands and times have come to terms with their own environments.

2. *The preparation of teachers who combine sound scholarship in their teaching fields with an understanding of the processes of human development and learning and who possess skill in motivating learners for high achievement.* Construction of new sequences of learning experiences will be of little value unless we prepare teachers who have a firm grasp of the objectives to be sought and a highly developed ability to motivate and guide learners in those elements most essential to their own growth and to the demands of a changing society. The programs of teacher education which we provide in the next decade will condition the quality of American education for the remainder of the twentieth century.

A good program of teacher education represents an extension of, and not a replacement for, liberal education. It should be built on elements which form the basis for understanding our own and other cultures; it should deepen the meaning of previous learnings through application to a variety of teaching-learning situations; and it should develop a spirit of speculative inquiry. The objective should be to produce teachers who will be able to motivate the learning processes through a rich variety of approaches.

The preparation of teachers should be one of the most highly valued activities on any university or college campus, and institutions not willing to attach such value to this function should disqualify themselves from participation in it. The evidence of valuing should be reflected in staffing policies, in salaries, and in the willingness of

faculty members from many departments to invest their time and thought in the improvement of teaching.

3. *Research in methods of instruction and experimental tryouts of promising ideas.* The quality of education demanded by our age cannot be achieved without increased emphasis on systematic research and on measures for translating research findings into educational practice. Education, in common with other social sciences, suffers from a double lag: slow progress in fundamental research and delay in using the findings. Perhaps the disease is even more pronounced in education than in the other social sciences. Certainly it is more devastating in its effects, because malfunctioning of education endangers the health of the whole society.

Students of education are aware of the need to develop theories of learning which take in account the purposive nature of the human organism. They recognize the need for intensive and sustained research into the nature of motivation and learning, the definition and measurement of teaching effectiveness, and many other problems central to the work of the schools. For this fundamental research we cannot rely exclusively upon the efforts of graduate students or the meager amount of time which professors of education can set aside from crowded teaching schedules. Instead, we need to build teams of highly competent researchers who will devote their major efforts over a period of years to the construction and testing of hypotheses with regard to the factors influencing education.

It will not do, however, to wait upon the development of an exact science of education. Application of the imagination to the improvement of teaching and the organization of learning experiences holds as much promise as the advancement of science. Improvement will come quickly if a large number of teachers and students of education become imbued with a spirit of experimental inquiry and if the promising ideas evolved are tried out under conditions which permit careful and continuous evaluation. The laboratory schools on university campuses should pioneer in this work as they did in the

period of the 1920's. Many other schools should encourage similar attempts by teachers to evolve and try out new ideas.

4. *Redesigning the administrative structure and improving administrative leadership.* In order to reap the full benefits from research, improved programs of teacher education, and curriculum revision, we must take steps to strengthen the organization and administration of our schools. Educational administration today is fraught with difficulties which arise in part from the mounting demands on education and in part from such factors as increasing enrolments, the shortage of qualified teachers, the inadequacy and inelasticity of school revenues, and the existence of many school districts too small to provide a modern program of education.

One of the most needed developments in educational administration is to define a role of professional freedom and responsibility for the teacher. The quality of education cannot rise above the character and competence of those who teach. We shall be able to attract large numbers of highly qualified men and women to teaching when we provide for the teacher with his group of learners essentially the same kind of professional responsibility that the physician has for the care of his patients. This calls for changes in the administration of our schools and for better understanding on the part of citizens of the importance of the teacher's role in our society.

Another challenge to administration is that of grouping pupils in such a way as to provide learning experiences that have continuity and sequence for the individual learner. This means that we must abandon our mass-production methods in education and allow each child to build one learning experience on another so that an integrated development results. This will require substituting, for our present system of grades, a flexible grouping plan that will permit a child to work with one group on reading skills, with another on science activities, and so on.

Consideration should be given also to the use of television, films, and other modern instructional aids as a means of extending the effectiveness of the good teachers now available. Attention likewise



should be directed to the building of more effective teaching teams through differentiation of functions and the training of personnel for specialized roles.

These are but a few, and perhaps not the most important, of the kinds of adaptations which must be made to bring our schools abreast of the conditions of our times.

Americans have always viewed education as an instrument of social progress—a means both to a better society and to the fulfilment of the individual in society. American schools have been responsive to the demands made of them. They have extended their reach, broadened their aims, multiplied their offerings, and expanded their services. The schools have a notable record of achievement, but their own aspirations and the expanding demands of society constantly set higher goals.

Now the demands on education are taking on new dimensions which, in essence, spell out the need for education of superior quality for the many instead of for the few. No such demand has ever confronted education before. Hope of meeting it rests upon the willingness of the American people to value their schools enough to put the requisite resources at their command. Both the provision of added resources and their effective use depend alike upon a continuing process of imaginative planning and systematic evaluation, leading to drastically reorganized sequences of learning experiences, improved patterns for the organization of teaching personnel, and the application of new knowledge and techniques to the learning process. In the redesigning of education to meet the new demands, the *School Review* aims to serve as a medium of discussion and communication.



CLARENCE H. FAUST

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## *Why the New Concern for Educating the Gifted?*

The title of this paper is not intended to question the value or importance of attention to the education of superior persons. Rather, it is designed to invite a consideration of some of the chief reasons for the new urgency many of us feel about adequate educational provisions for young people of exceptional abilities. An analysis of the reasons for our sharpened concern for the education of superior students might do more than merely strengthen our interest in the problem. It might be useful in suggesting the lines of thought, planning, experimentation, and new educational development along which we have the best prospects of success in educating the gifted.

There are two major sources of our newly aroused interest in adequate educational provisions for the gifted. One of these is an awareness of certain urgent needs of our society in these troubled times. The other is a clearer sense of the meaning and responsibility of democratic education with respect to the development of individual capacities.

I am sure that I need hardly do more than mention the first of these concerns. The articles on "The Creative Manpower Shortage in the United States" and "Educational Implications of the Nation's Manpower Needs," also appearing in this number of the *School Review*, explore this aspect of the matter fully and convincingly.

Perhaps the greatest change in the general outlook of Americans since my boyhood has been the emergence, as a consequence of two

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world wars and of the periods of uneasy and precarious peace which have followed them, of a sense of the possibilities of disaster for America and for Western civilization. Those of us who can remember what Walter Lippmann has described as "the soft air of the world" before the two world wars of this century recognize that the attitude of men with respect to the future has changed radically. Before 1914 we expected steady and almost inevitable progress on all fronts of human welfare. We fondly supposed that great wars would never again take place. We were confident that democratic forms of government would ultimately be adopted everywhere. We could not conceive that democracy would be seriously threatened or even challenged.

Over the past forty years, and especially over the past fifteen, we have had an increasing sense that continuation of our progress was not at all inevitable, that indeed we faced menacing possibilities of disaster to America and to Western civilization, and that, if we were to avoid catastrophe or a slow and sad decline of the kind Spain and Rome had known before us, we must muster all the resources of wisdom and energy available to us. It has been increasingly clear to us also that our ultimate dependence must be not upon our material resources but upon our human resources. The strength, indeed the very life, of our democracy depends on making the most of our human potential. And certainly a large share of the work of developing our human resources falls upon education. In short, one source of the new concern for the education of the gifted is our awareness of the urgent necessity to make the most of the very best of our human resources in these momentous and fateful days.

I like to believe that a second basis for our sharpened concern for the education of superior young people is located in our concern, not for society as a whole, but for the individual. Adequate provision for the education of exceptional talents is important, quite apart from its value in producing creative leadership in society, in that it provides for the fullest flowering of the individuals who compose the society. And I take it that our ultimate aim is to achieve national or

social strength, not for its own sake, but for the sake of providing the conditions in which each individual may realize his possibilities.

It is not exaggerating matters to say that we have neglected or undervalued this function of education. In making the great strides we have taken to provide the kind of education a democratic society needs, and especially in providing universal education, we have, perhaps naturally, stressed the giving of a quantity of education to all young people. Our commitment to universal education, to education for everybody, led us to a concern for giving some education to each. And in our concentration on this effort we were inclined to decry, as undemocratic, the giving of special attention to some. Provision for education of the gifted was opposed because it was said to be aristocratic, tending to the creation of an elite, and fundamentally undemocratic.

In the past several decades we have come to see that democratic education does not necessarily mean equal *amounts* of education for all but means equal *opportunity* for education to all. Insofar as we have come to this view, we are recovering insights of the founding fathers of the Republic. There is an interesting and illuminating correspondence between John Adams and Thomas Jefferson on this point. In their old age these two, who had stood shoulder to shoulder through our war for independence and later become bitter political foes in the new republic, entered into correspondence about their agreements and differences. John Adams seems to have been convinced that Jefferson was guilty of a kind of unrealistic and dangerous leveling, or egalitarianism, and in several long letters written in 1813 Adams argued that, whether we like it or not, there is among men a natural aristocracy and that to pretend that it does not exist is to court political and social disaster. Jefferson's reply was in the soundest democratic tradition. He wrote:

I agree with you that there is a natural aristocracy among men. The grounds of this are virtue and talents. . . . There is also an artificial aristocracy, founded on wealth and birth, without either virtue or talents. . . . The natural aristocracy is the most precious gift of nature, for the instruction, the progress, and the government of society. . . . May we not even say, that that form of government

is the best which provides the most effectually for the pure selection of these natural *aristoi* into the offices of government? The artificial aristocracy is a mischievous ingredient in government, and provision should be made to prevent its ascendancy.

Jefferson then goes on to point out that the proposals for the abolishing of entails and of the privilege of primogeniture, together with another bill he had placed before the Virginia Legislature "for the more general diffusion of learning," were designed to lay "the ax to the foot of pseudo-aristocracy" and to provide for the discovery and development of unusual talents.

I like to believe we have lost any notions of an undemocratic and aristocratic sort that might block the extension of education to all American youth, and that we are now prepared to see the force of Jefferson's argument. We are, I hope, as much opposed as ever to the creation of an artificial aristocracy through processes of education, but I hope we are also prepared to accept the view that the opening of equal educational opportunity to all, with provision for the full development of persons with superior abilities regardless of social or economic class or of nationality or race, is one of the prime responsibilities of democratic education.

If we accept this view, the question becomes: What kind of provisions should education make for young people of superior capacities? The simplest approach would seem to be to set up testing programs designed to identify the gifted, to establish instructional programs calling fully upon their ability and developing fully their capacities, and to institute guidance programs which would make sure that the gifted take the courses they ought to take. There are, it seems to me, serious objections to this formula, at least in its simplest forms. The process smacks of a kind of "human engineering" in which a democratic society ought not to engage. It seems, moreover, to be related much more closely to the first of the two considerations for concern about the education of the gifted than to the second, that is, it tends to stress the needs of society to the point where individuals come to be seen merely as social instruments and as means to the achieve-

ment of social ends. A test of the difference would be the question whether a young person capable of very high achievement in one line of activity and much less in another is or is not better off in the second if he strongly prefers it. I should be inclined to say that, even in this extreme and oversimplified case, the freedom of the individual is more important than the desires, or even the needs, of society.

There seem to me difficulties, in any case, with the emphasis on identification. People capable of high achievement may be late bloomers, who would be overlooked in the effort to identify exceptional possibilities at an early age. The biographies of men of very high achievement will, I am confident, support the view that there is no point at which the signs of the capacity for high achievement can be confidently expected.

If furthermore, we are concerned with really creative capacity, the task of identification, early or late, is extremely difficult. Almost by definition, the creative, imaginative, original mind will fail to fit the patterns on which any general process of selection must naturally depend.

Finally, high achievement is certainly not the result merely of native ability but of varied and complex interrelationships of native ability, intellectual energy, motivation, and even cultural background. Student X with a very high intelligence quotient may lack other characteristics necessary to really high achievement, whereas Student Y with lesser native intelligence may possess the energy and motivation to go far.

Besides the difficulties of identification, I should like to note also the difficulties of educational programing for exceptionally talented students. To begin with, the children and young people of any community cannot realistically be divided simply into the gifted, the average, and the handicapped. Examination of their abilities and promise would certainly present a continuum rather than a hard and fast tripartite, or even many-compartmented, division. There cannot, therefore, be a program for the gifted and another for the average. The range within each of these groups and the overlapping between them on various counts would make such an arrangement artificial,

and the problem of individual differences would, if we were realistic and conscientious, arise anew within each group.

Where, you may reasonably ask, does this lead us with respect to the education of the gifted? Not to the point, certainly, of disenchantment with it or despair about it. If there is anything in the analysis I have made, certain general principles may be suggested. How these might be put into effect in concrete educational programs may be another matter, though I should be surprised if there were not already a considerable body of relevant concrete experience to bring to bear on the question.

What seems to me to be suggested by way of general approach is that processes of testing to identify the gifted and special programs for the superior students who have been thus located by testing should be a subordinate rather than the main line of approach to the problem. I would suggest that the main line of approach be that of introducing much greater flexibility into educational programs, so as to open up to all students the possibilities of enrichment, acceleration, and independent study which seem peculiarly appropriate for exceptionally able students.

All three of these devices are important for the gifted students. These students ought to carry much more demanding work than is now required of them. They ought not to be held back in the lock step of the elementary-grade and, later on, of the course-credit systems. Their capacity for originality and for creative work should be stimulated and developed by truly independent study. Enrichment, acceleration, and independent study are essential to the development of superior capacity. And there seems to be no reason why students of superior intellectual power or exceptional intellectual energy or excellent motivation should be restrained within the bounds of the elementary-school unit of study, the high-school course, or the college course, except as a matter of convenience to teachers and administrators.

But opportunities for the three kinds of enlargement of education mentioned should not, I am convinced, be limited to those who, by



some series of tests, have been identified as exceptionally capable. These opportunities should be open to all, partly because success in making the most of them depends upon so complex an interrelationship of many factors that identification is difficult, partly because the capacity to profit from them may emerge early or late or suddenly, and partly because the process of human engineering involved in classifying and directing into what seem to be appropriate programs a group known as the gifted would, in the long run, be a threat to human individuality, independence, and freedom. That some students would overestimate their capacities and enter upon programs that they could not carry through does not seem to me a valid objection to offering the opportunities to all. A student's discovery that he has overestimated his abilities or energies or fortitude is itself of educational value and would, I am convinced, be much less likely to generate a sense of inferiority or instability than is the attempt at rigid classification. Testing devices would have their place as a basis for advice and stimulation, but not as a source of stratification in the school system. Programs providing open-ended opportunity for talent and ambition would need to be devised, but not as the privilege of one order of students only. Students would be expected to develop quite unevenly, coming in some areas to achievements far beyond those of most of their age group, or perhaps in other areas falling behind them.

I recognize that one of the difficulties with proposals for such programs is the students' presumed lack of interest in exceptional achievement. One of the fears of the people who devised the program for gifted children in the Portland (Oregon) public schools, which the Fund for the Advancement of Education has supported, was that students would fear to be labeled as "brains" if they attempted to go beyond the ordinary level of achievement of their fellows. These fears proved wholly ungrounded. Although it is unsound to generalize from the experience of a single school system, one is tempted to conclude that the present climate of opinion among youngsters is not unfavorable, as I suspect it might have been two or three decades ago, to exceptional achievement.



In any case, the problem of student motivation is ultimately a problem of community and the home. With respect to the attitude about adequate educational provision for the gifted, it would seem that schools are in a vicious circle. They cannot go far beyond community opinion on the subject. On the other hand, community opinion is, in large part at least, ultimately affected by the education that members of the community have themselves received in the schools. The readiness of school systems to spend, as they do, much more upon the education of the handicapped than has been spent on the education of superior talents is, I suppose, a reflection of the general humanitarian acceptance of responsibility for the handicapped and some general, though vague, feeling that special attention to the gifted is undemocratic. I am convinced, however, that the same reasons which have moved educators to a new, or at least a sharply increased, concern about adequate education of the gifted are also affecting the views of parents and of the community as a whole. We stand a good chance of making in the near future great advancements in education by providing adequately for gifted students.

Our great problem is to make sure that the provisions are sound in principle or, to put it negatively (which is perhaps all I have succeeded in doing), that we do not fall into the mistake of viewing young human beings as merely means to social or national strength or of setting up arrangements which produce a new artificial stratification of our youth. If we can avoid these pitfalls, we shall do more than merely strengthen our society in general by making the most of its human resources; we shall correct grievous weaknesses and inadequacies in our present educational system. Above all, we shall take some long strides forward in providing the kind of education appropriate for, and indeed required by, a democratic society, an education in which the best possible conditions are provided for the fullest flowering of the wide and promising range of individual human capacities and the unrealized and undreamed of creative possibilities of individual human beings.

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## *Conditions Favorable and Detrimental to the Development of Talent*

How many of the gifted children found in the schools will realize their potentialities and become distinguished persons, contributing in an outstanding way to the welfare of their society and gaining for themselves the satisfactions of excellent performance? Under present conditions, certainly less than half of them will do so.

Even this, however, is not a bad situation when compared with what other societies have done for their gifted children. Probably no other society has done as well as the United States in this respect. Even Athens at the height of her creativity in the fifth century, B.C., or Florence in the Renaissance, or England in the sixteenth century, reached these peaks without having utilized the latent talent of the great mass of the people, who were submerged in slavery or grinding poverty. It is only when the facts of the development of talent in present-day America are compared with what might be and what the democratic ideal suggests they ought to be that the record looks inadequate.

Americans generally believe in the unique value of the individual and in the desirability of his developing his abilities, whatever they are, along socially valuable directions. The development of ability requires education, and Americans have great faith in the power of education to bring out the latent excellence of a person.

Then, too, there is the American discovery that the poor and downtrodden produce many children who have remarkable talents.

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It is understood that these talents cannot flourish in a non-supportive family or a barren community environment. As people have come to recognize the importance of the environment in developing talent, the attitude has gained ground that society should seek to discover and to help the talented but underprivileged child or youth.

These positive attitudes toward the use of education to develop gifted children are balanced by some negative attitudes. There has been the belief that "talent will out" in the American environment; that, if it is real talent, it will be irrepressible; that it will follow a natural course of development; that it should not be rewarded until it has fully proved its worth in competition. Coupled with this has been the Puritan attitude that nothing good should come easily, that a person should work slavishly, especially while young. He should sell newspapers on cold street corners, memorize long lists of spelling words, work all the problems in the geometry book, wait on tables in the fraternity house, wash beakers in the chemistry laboratory. To complicate the situation further, Americans tend to distrust the talented person who is somewhat "queer." If a child has a remarkable aptitude in mathematics, or music, or poetry, especially if he does well in these areas without apparent effort, he is regarded as psychologically abnormal, with the unfavorable nuances that are part of abnormality in American thought. As a result of these attitudes, there is an American tendency to discourage the development of special gifts in children and to encourage them to become "well-rounded" superior persons rather than somewhat eccentric geniuses.

This emphasis upon social and emotional adjustment has been buttressed by a corresponding emphasis in society as a whole on security and conformity at the expense of freedom. Children and adults are taught the virtues of co-operation, of being a smooth-working part of a team, or group, or corporation. In this situation an outstanding individual success may cut one off from the group, and this may be such a severe threat to a student that he will deliberately do less than his best, "reduce output," so as not to get better marks than most of his fellows. The aloneness of creative achieve-

ment cannot always compete with the need to be a part of the group.

Under these circumstances, despite the relatively large educational opportunities in America, a great deal of talent remains undiscovered, undeveloped, and unrewarded. By any ordinary definition of talent, at least half of the talent of American youth suffers this fate. Thus it seems that the gifted child is favored by the abstract American ideals of opportunity and of the desirability of developing the individual to his maximum but that specific attitudes penalize him. In school and community the gifted child may be treated in ways which make him content with a performance and a developmental level definitely under his capacity or which may even discourage his attempts at spontaneity and individual excellence.

With the public's ambivalent attitudes toward gifted children, the American school system also operates both to encourage and to discourage the development of talent. By offering educational opportunity at the secondary-school and college levels to a higher proportion of youth than does any other country, the American schools act to discover and develop talent, especially of the intellectual variety. On the other hand, the fact that the schools are non-selective means, in effect, that the average high-school student body consists mainly of boys and girls with ability just average or slightly above or below average. The proportion of gifted youth can hardly exceed 25 per cent in the ordinary comprehensive high school. (This estimate is based on the assumption that the top 20 per cent of the population may be regarded as gifted intellectually, artistically, or socially. Since a few of the slower pupils drop out of high school, the proportion of gifted in the high school will be somewhat greater than it is in the general population.)

Thus the gifted youth are likely to be outnumbered in the high school and college classes as well as in the elementary school. Unless the teaching is remarkably skilful and clearly directed toward stimulating gifted students, such students tend, when outnumbered, to adopt the learning pace and the attitudes toward learning of their average age mates. This is particularly likely to happen in America

where the pressure of the peer group to conform to peer standards is greater and more effective than it is in any other country that has been studied in this connection.

While conditions in the schools are ambiguous with respect to the development of talent, there is no such ambiguity about the demand for talent in the adult world. The American economy is desperately short of highly trained minds. This pressing, immediate need has been well publicized in recent years. What is less well understood is the present crisis in world civilization as a whole. Civilization is rapidly approaching the point in its development where it must achieve new levels in the utilization of the resources of the world or forever fail to develop them. The burden of making such advance in controlling and developing the environment falls largely on the shoulders of the gifted.

Social conditions may favor or discourage the development of gifted people. In exploring the influence of such conditions, it is necessary to distinguish between the production of highly specialized talent, such as artists or musicians, and the production of superior persons with adequate training to do work that requires a high level of skill and knowledge but does not necessarily require creativity.

Conditions favoring the appearance of productive genius may not be the same as conditions favoring the appearance in large numbers of superior craftsmen of the mind and the market place. One such condition has already been mentioned: the demand for well-trained superior people. Another condition is economic prosperity. With economic prosperity there is money that can be spent by parents and by philanthropy on the training of young people. There is also money to spend on art, music, literature, and the theatre and thus to support the work of people in the arts. Less tangible, but certainly important in the making of an environment favorable to the development of gifted children, is the belief that everyone should attempt to achieve in relation to his capacity. "From each according to his ability" is a generally accepted American attitude.

In general, because the economic situation is favorable and be-

cause the attitudinal climate is at least partially favorable, children with superior potential abilities are in a relatively good position to receive help in developing their potential abilities into real existing abilities. The society expects education to give this help. It is as clear a mandate from society as any the schools are likely to receive.

If only about half of the ablest 20 per cent of gifted children actually develop their abilities to a point where they make an important contribution to society, who are the other half, and why do they not develop their talents more fully? The general answer to this question is that those with undeveloped talent are persons whose environments have been least favorable to the production of high-level ability.

Girls, and children from families of low socioeconomic status, form the two large groups of persons with potentially high ability whose environment has not provided stimulation for the development of talent. Children from low-status families fail to develop their abilities because of lack of opportunity and stimulation—a lack commencing in their earliest years. Their families do not encourage them to read, to learn music, to draw pictures, to develop scientific hobbies, or to do any of the things that can bring budding talent into flower. Many of them live on subsistence farms, where the family simply struggles to survive. Lack of stimulation is, in general, characteristic of low socioeconomic families, but there are exceptions in which a working-class family does as well by a gifted child as does a family with more means. However, when the child of a lower-status family reaches high school, he often feels a pressure to get out and earn money, and he seldom gets the kind of financial support, from home or through scholarship aid, which will carry him through college or through a program of special training.

The true importance of the factor of socioeconomic background has not always been recognized because until quite recent decades the notion has prevailed in Europe and America that high ability was to be found almost entirely in the upper classes and was inherit-

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ed according to simple laws of heredity. The modern view is that a large amount of potential ability remains under-developed because of lack of environmental stimulation and that most of this under-developed ability is to be found in people of lower socioeconomic status and in women of all social levels.

Women as a group do not develop their abilities to as high a degree as men because society does not expect them to do so. Girls, however, show fully as much talent as boys do. In fact, girls excel boys in achievement tests and in artistic, musical, and writing ability. They hold their own with boys in social leadership up into the high-school years. In adolescence the pressures of society make them want to adopt feminine rather than masculine roles. The feminine roles stress tenderness, tranquillity, submissiveness, in contrast to the ambitiousness, productivity, and aggressiveness which are stressed in the masculine roles.

Even though the twentieth century gives women a wider variety of acceptable roles than did the nineteenth, the social pressures still operate to suppress the high-level development of talent in most women in favor of motherhood, homemaking, and emotional support of a husband. Thus, although there are excellent women novelists and poets and singers, there are no women musical composers of note; no orchestra conductors; few famous performers on musical instruments; relatively few women college presidents, artists, lawyers, doctors, or scientists.

Most of the children of both sexes who exhibit giftedness come from middle-class homes, although the majority of all children enrolled in the schools come from working-class homes. These facts are illustrated by the results of a program of discovery of talent in the seventh grade in the public schools of Quincy, Illinois. Fifteen schools were ranked on the basis of the average socioeconomic status of the children attending them. The school in the high-status neighborhood enrolled a relatively high proportion of the children who, at the age of twelve or thirteen, showed high-level ability, while the school in the slum neighborhood enrolled almost no gifted chil-



dren. Still, a considerable number of boys and girls showing talent at this age came from working-class and lower-middle-class families (1). It is in this group that lack of financial ability and lack of family expectation will operate most heavily to prevent the development of latent talent through education or special training.

From another part of the country there is further evidence of the effect of low socioeconomic status in suppressing the development of talent. Boys in the second and third years of public high schools of the Boston metropolitan area were studied. The highest 20 per cent in intellectual ability were asked whether they expected to go to college (2). Those whose fathers had high-status occupations generally expected to go to college, while boys whose fathers had low-status occupations generally did not expect to go to college.

Estimates of the educational progress of the ablest youth in the population of the entire country show that most children of upper- and upper-middle-class families go to college if they are in the upper quarter of the population in intellectual ability. On the other hand, while 45 per cent of the ablest quarter of youth come from homes of manual workers, less than one-fourth of this group graduate from college (3). While the factors of environmental stimulation and of financial ability both operate to reduce the numbers of able youth who develop their abilities through higher education, there has been great progress in the past fifty years in recognizing the potentialities of these youth and in giving them educational opportunities. Compared to the nineteenth century, the present century is more favorable to the discovery and development of talent in children of lower socioeconomic status and also in girls.

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## *The Creative Manpower Shortage in the United States*

One of the major problems challenging the field of education in general, and the education of the gifted child in particular, centers on the future manpower supply and demand in the United States. In accepting this challenge and in exploring and assessing the critical area of our manpower future, the educator underlines his goal of developing the individual to the maximum of his talents, aptitudes, and interests and recognizes how this goal is allied with society's similar aim for the most capable workers across the occupational structure.

All of us are keenly aware of the current shortages of manpower, not only of professional personnel like teachers, nurses, and engineers, but also of technicians and skilled workers and, indeed, of well-qualified persons in every occupational field. It is certainly a sign of intelligent planning to try to evaluate, against the background of today's problems, the major future trends in this field.

Recent manpower developments have brought into extensive use (and often, perhaps, abuse) the term "creative manpower." What do we mean by this term?

A generation or so ago, this question would have brought the practically unanimous reply that creative manpower refers to the artistic and literary professions—writers, sculptors, painters, composers, and the like. Today, in our science-oriented age, engineers and scientists are the groups that first come to mind when we talk about crea-

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tive manpower. It is one of the fundamental propositions of this paper, however, that the term "creative manpower" cannot be limited to any one group. Our national security, as well as the continued expansion of our economy, depends in a significant and substantial way on new scientific discoveries and their engineering applications. No one can quarrel with that. But this should not overshadow the fundamental importance that creative manpower in medicine, in teaching, in public administration, in the law, and so on bears to our national welfare and to the survival of our form of government.

Indeed, creativity is needed throughout the occupational structure; it is not the birthright, the monopoly, or the unique need of any one occupational class. Where more do we need creative talent than in teaching, with its enormous impact on the growing individual? Than among skilled workers, who translate ideas and blueprints into actual forms for the factory production line? Than among the executive and managerial groups, which are responsible for leadership in their respective fields? Than on the farm, where the same number of persons as were employed in 1870 are now producing an enormously increased amount of food and fiber for a growing population, both here and abroad?

Our definition of "creative manpower" therefore would run as follows: *Creative manpower represents those individuals who, through their innovations, help us advance toward a higher standard of living and a higher level of national security.* They exist, and are needed, at every level of our society, across the occupational structure of the United States.

These innovations need not be—in fact, rarely are—of the major, headline-making variety. They most often are small, evolutionary changes, which, step by step, help us advance toward our goals.

We come now to the second part of our title: the question of "shortage." At this point it is worth while to remember that the United States has coped with manpower shortages throughout practically all of its history. Only during the thirties, when we and the rest of the world went through an extraordinary, and unhappy, peri-

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od of readjustment, was there any real long period of unemployment in the United States. We have been a country of enormous growth and change, building up an industrial plant of great technological efficiency, absorbing millions of persons from abroad, and supporting a steadily growing population in an ever increasing standard of living.

In what way, then, is the current period different from other phases of our national history? The touchstone of our problem today is the *quality* of our labor force. When we use terms like "creative manpower," we are reaching for words that will emphasize to everyone our critical need for more and better-qualified personnel in our labor force. In the studies we have conducted and are now pursuing in the Department of Labor, we come across numerical shortages in many occupations: in research and development, in teachers for the elementary schools, in clinical psychology, and so on and on. But what we hear about in practically every occupation is the great need for people at the top levels of knowledge, skill, and creativity. For example, in a recent study on the shortages of scientific and engineering personnel in industrial research, many companies reporting no immediate numerical shortage emphasized, nevertheless, their need for scientists and engineers with more advanced training or better professional qualifications.

This emphasis on quality is not surprising at all if we remind ourselves of how two important forces have joined in the beginning of the second half of the twentieth century to give us an unparalleled period of change. First, we are witnessing a significant period of technological advance, in which we are actually crossing new thresholds in the sciences. If history is any guide at all, then it is clear that every available top resource is needed if we are to cross safely the frontier of a new source of power. Second, we are living in an equally unprecedented period of international stress. And again, we have to look to research and technology for the weapons that will help us achieve the final victory in this arena.

Put these two developments together, and it is quite evident why,

at this juncture of our history, we are emphasizing the need for *quality, creativeness, and leadership* that will help us move through this great period of change. And, in light of these developments, it is almost gratuitous to remark that there is a particular sense of urgency for the optimum development of persons whose abilities and gifts will enable them to fill the creative needs of our society.

Now, what of the future?

The staff of the Department of Labor has recently completed an analysis of future occupational requirements through a study of industrial employment trends and the changing occupational composition of each industry. Such work, of course, is always subject to change as new information on levels and trends becomes available. However, for our present purposes we have asked ourselves: What will the occupational structure of the U.S. look like in 1965 and 1975, assuming a continuation of the trends that have been operating in this country during the first half of this century?

Focusing on 1965, we find, first, that the population is expected to increase by about 25 millions during the next 10 years—the equivalent of adding a city the size of Chicago to the United States about every 18 months for the next 10 years. This expansion is expected to generate demands for additional consumer goods, housing, highways, and capital investment.

Second, we project about 50 per cent increase in the gross national product by the middle sixties, assuming productivity increases of the kind we have had up to now. This would amount to an increase of about 25 per cent in the gross national product per capita—the total amount of goods and services available for every man, woman, and child.

Third, we note that these developments call for an expansion of about 11 million jobs between 1955 and 1965.

What kinds of changes in our occupational structure will these 11 million additional jobs bring? Table 1 presents some of the major changes we can foresee on the basis of our studies and projections so

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far. There are many important and interesting dimensions to these data, but this paper will present only a few of the high lights which are particularly relevant to the problem under discussion.

1. One of the most impressive areas of growth is represented by the professional worker. If previous trends continue, professional

TABLE 1

EMPLOYMENT IN MAJOR OCCUPATIONS OF THE UNITED STATES IN 1910 AND 1955 (ACTUAL) AND IN 1965 AND 1975 (PROJECTED)\*

	NUMBER (IN MILLIONS)				PER CENT			
	1910	1955	1965	1975	1910	1955	1965	1975
Total employees...	35.5	61.7	73.1	83.2	100.0	100.0	100.0	100.0
White-collar employees.....	7.9	23.8	30.5	36.6	22.3	38.7	41.6	44.0
Professional.....	1.6	5.7	7.8	10.0	4.6	9.2	10.6	12.0
Proprietors and managers.....	2.6	6.0	7.3	8.3	7.3	9.8	9.9	10.0
Clerical and sales.....	3.7	12.1	15.4	18.3	10.4	19.7	21.1	22.0
Blue-collar employees.....	13.3	24.7	29.4	33.2	37.4	40.2	40.3	40.0
Craftsmen.....	4.2	8.2	10.2	12.0	11.8	13.4	14.0	14.5
Operatives.....	5.0	12.8	15.6	17.9	14.1	20.8	21.3	21.5
Laborers.....	4.1	3.7	3.6	3.3	11.5	6.0	5.0	4.0
Service employees.....	3.4	7.2	8.1	9.2	9.6	11.3	11.1	11.0
Farmers and farm workers.....	10.9	6.0	5.1	4.2	30.7	9.8	7.0	5.0

\* Sources: For 1910, United States Bureau of the Census, *Thirteenth Census of the United States: 1910*.

For 1955, United States Bureau of the Census, *Monthly Report of Labor Force*, April, 1955, Series P-57, No. 154.

For 1965 and 1975, unpublished data from the United States Department of Labor, Bureau of Labor Statistics, 1956.

personnel may hit close to the 8 million mark by 1965, accounting for a little over one out of every 10 workers—more than double the 1910 figure. There is real need for expansion in many of the important groups here. The one million workers in engineering and science, the one and a half million in teaching, and the million in medical services (doctors, dentists, nurses, etc.) will undoubtedly increase sharply and account for a major part of the expansion in professional employment over the next decade.

2. The two other groups comprising the white-collar occupations are also expected to increase—particularly clerical and sales people,



who already account for one out of every five persons in the labor force today. Taken together, the white-collar occupations actually have reached a historic position. Our latest information shows that in 1956 they represented the single biggest group in the labor force, and they are expected to be farther ahead by 1965 and 1975. A few years ago we reached a similar situation in our industrial distribution: there were (and are) more people employed in industries producing services than those producing goods. Now the occupational distribution has reached the same stage: today we have more white-collar than blue-collar workers in the American labor force.

3. Another important group that is expected to expand, both numerically and percentage-wise, includes the industrial workers at the craftsman (skilled) and operative (semiskilled) levels. We expect increases particularly among the building trades; the metal trades; and the skilled mechanics, repairmen, and technicians.

4. On the other hand, reductions seem to be in prospect for both the farm segment of the economy and the less skilled laborers. If past trends and current technological developments, such as automation, are indicative, we may expect an actual decline in employment in these occupations in the face of an 11 million rise in the total number of jobs.

All this adds up to a continuing rise in the skill level of the American labor force: in the number and proportion of workers requiring extensive education, training, and skill development; in the number of high-quality personnel we call "creative manpower"; in the need for the especially able or gifted in our population.

Can we meet these needs? Where will the additional workers come from?

Table 2 describes the age, sex, and composition of the American labor force in 1955 and the way we expect it to look by 1965. To project and look ahead to 1965 in this field is possible because all persons who will be of labor-force age in 1965 (those who will be fourteen years of age and over in 1965) already have been born. In a



country like ours, where the net inflow from abroad is at relatively low levels, the dimensions of our labor force are given by the size and composition of the population. As we all know, during the past quarter of a century our population has been subject to some dramatic changes, which, in turn, play a determining role in shaping our current as well as future work force.

TABLE 2

THE LABOR FORCE OF THE UNITED STATES CLASSIFIED BY AGE AND SEX IN 1955 (ACTUAL) AND IN 1965 (ESTIMATED)

	1955 (In Millions)	1965 (In Millions)	Change 1955-65 (In Millions)
<i>Total labor force.....</i>	<i>68.9</i>	<i>79.3</i>	<i>+10.4</i>
<i>Males.....</i>	<i>48.1</i>	<i>52.9</i>	<i>4.8</i>
14-19 years.....	3.4	5.0	1.6
20-24 years.....	4.9	6.0	1.1
25-34 years.....	11.5	10.7	— .8
35-44 years.....	10.8	11.4	.6
45-54 years.....	8.9	10.2	1.3
55-64 years.....	6.1	7.0	.9
65 years and over....	2.5	2.6	.1
<i>Females.....</i>	<i>20.8</i>	<i>26.4</i>	<i>5.6</i>
14-19 years.....	2.0	3.0	1.0
20-24 years.....	2.4	3.1	.7
25-34 years.....	4.3	4.2	— .1
35-44 years.....	4.8	5.7	.9
45-54 years.....	4.1	5.8	1.7
55-64 years.....	2.4	3.5	1.1
65 years and over....	0.8	1.1	0.3

In round numbers, our figures show that the anticipated increase in labor force by 1965 will be distributed as follows: about 4½ millions will be young persons of 14-24 years of age; about 5 millions will be 45 years of age and older; only about one-half million will be between 25 and 44 years of age. And more than half of this total increase will be represented by women.

The composition of this labor supply makes a number of important points, some of which we can only touch upon here. For example, the so-called "older worker" is going to be a major supplier of labor in the decade ahead, and more than half of the increase in our total labor supply is going to come from women. In the kind of labor

market we project, setting up age or sex barriers to employment would simply cut us off from worker resources—a poor policy at any time, and doubly so in a decade when workers will be in such short supply.

The kind of short supply we anticipate is dramatically illustrated by what is going to happen to the group 25–34 years of age, one of the prime age groups in terms of career development and contributions to the skills of the American work force. In the face of a 25 million increase in population, this age group will experience a *decline* of about 2½ millions between 1955 and 1965. A little reflection will tell us why: this is exactly the age group born between 1930 and 1940—a period of low birth rates in our history. As a result the number of workers in this age group will also go down—by about 900,000 persons.

These figures point to the critical importance of the younger persons in meeting our future manpower needs. As indicated, the group 14–24 years in the labor force is expected to go up by about 4½ millions by 1965. These are the persons who *now* make up the elementary-school population of the United States and who in the immediate years ahead will comprise the secondary-school enrolment. Thus what we do *now* in the schools will irrevocably affect a major portion of the pivotal manpower resources of the next decade.

These, then, are the dimensions of our future labor demand and supply. To gear them in effectively to the country's economic and defense systems is going to require the co-operative efforts of all of us at the federal, state, and local levels, in business, industry, and labor. No matter how we look at this complex, much is going to depend on the uniquely critical contribution that the schools will be called on to make in providing the amount and kind of education needed to supply the nation with a work force whose talents and gifts have been developed to their maximum. In a very real way, a work force so trained is what we are going to need to insure continued technical progress, to raise our standard of living, to strengthen our national defense, and to provide leadership for ourselves and the world.

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## *Educational Implications of the Nation's Manpower Needs*

The manpower situation in which the United States finds itself today is a compound of three sets of factors: (1) changes in the structure and the distribution of the population, (2) rapid changes in technological development, and (3) heavy demands for manpower in the interest of national defense. These three groups of factors create a new situation for America. While it is too much to say that we are in a period of crisis, the present is certainly an era of urgency in developing the human resources on which the American economy and culture depend.

The most significant aspect of the population situation is found in the present increased proportion of young people, the increased proportion of older people, and the decreased proportion of people in the most productive age group of about twenty to sixty. We are in a population trough so far as the productive years of young adulthood and middle age are concerned; a smaller group of working-age adults have to support a larger number of youth and a larger number of retired persons. What might be referred to as a "normal" balance among the age groups may be restored about 1970, but for a decade or two we are likely to feel a heavy pressure of demand to fill the labor force. Shortages arise in part from this new distribution of age groups in the population.

Certain other population factors influence the present situation. This year, women outnumber men by about a million and a third,

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and they are increasing this lead by about a quarter of a million a year. Women, married and unmarried, now tend to be "gainfully occupied outside the home" on a scale heretofore unknown; women work for a longer portion of their lives and in a greater variety of occupations than in the past. The distribution of population throughout the country also continues to change. The clustering of people and lines of communication and of cultural and economic activities in large metropolitan units or areas is a phenomenon of basic importance to society. The rise of the modern metropolis, with its urbanization and suburbanization of society, is a factor of great consequence in determining the further course of American development.

It should be pointed out, also, that the American population continues to be unusually mobile. People move, not only toward the cities, but also west and south. Some sections are growing phenomenally; other sections are actually losing population. The national picture of population facts and trends is but background; it must be supplemented by studies of specific areas and communities before the influence of demography on the manpower situation can be fully appraised—and before individual schools and colleges can make needed adjustments to manpower demands.

These population changes are particularly important because they are taking place in conjunction with certain changes in technology. In this decade we are entering another aspect of the industrial revolution, characterized by the rapid development of automatic processes and by the harnessing of new sources of power that come from the atom and from the sun. Within the past decade automatic processes, both mechanical and electronic, have revolutionized some industries. We seem to be in the midst of extensive shifts in the occupational pattern, with emphasis placed increasingly on jobs involving the construction, control, and maintenance of automatic machines. The heavy emphasis on applied science, on research, on the rise of a new group of semi-professional occupations has increasing effect on job patterns, and consequently on education.

These population trends and technological developments come at

a moment in American history in which defense demands are high. With some three million men and women, most of them young and vigorously able, in the armed forces, shortages of manpower in other fields are accentuated. There seems little likelihood that the numbers needed for the defense establishments will be effectively reduced in the coming decade or two. Moreover, the armed services demand the same qualities of ability and training that many industries and institutions demand; research and applied science are fully as important to defense as to technology.

These three sets of factors, then, coming together in the vastly complex 1950's, constitute the elements of the manpower situation. In the stress of these circumstances, certain manpower demands emerge with special clarity. The demands, expressed in terms of salaried jobs available, may not be identical with national needs. We may need more poets and philosophers than we have in order to insure the best society we can envisage. But in terms of demands, there is emphasis at present on providing personnel for research enterprises, for various health occupations, for engineering and technology, for supervisory and executive personnel, and for teachers.

While demands in these fields and needs in others are pressing, they are not a cause for panic. Within the American population are resources of talent and ability adequate to meet the situation if we can draw upon all available resources and can educate available ability to its highest level of capacity. Young people now emerging into adulthood are, of course, the primary resource for meeting demands and needs. We ought to educate them with increasing effectiveness, but, in addition, it is likely that the economy can utilize with greater effectiveness the resources now resident in minority groups, in women, in under-educated adults, and in the older population. The manpower problem arises, not in the absence of resources, but in the adequate utilization of available resources.

The first conclusion to be drawn from these observations about the manpower situation is that education is now more important

than it has ever been. In effect, we are faced with an education shortage rather than a manpower shortage. Every occupational area of pressing shortage listed above is an area requiring advanced education on the part of those who enter it. We have evolved a society and an economy that demand more and more education of those who keep the organization operating. It is only an over-generalization rather than an untruth to say that a college degree is about as advantageous for a career today as a high-school diploma was at the turn of the century. We are at a point where more education is demanded of more people and for longer periods of time than before. An upgrading of the whole labor force is requisite for an expanding economy, and the need for the upgrading has been dramatically demonstrated by the circumstances of the manpower problem.

"Upgrading of the labor force" is but another way of saying "educating individual ability to the highest possible level." The contemporary need for educated manpower impels us toward further realization of the democratic ideal of individual development. This calls for a tightening of standards of performance at all school and college levels, a motivation of individuals toward higher achievement on their part, and a lengthening of the education program.

Recognizing that schools and colleges must intensify their efforts to bring out the latent talent of all youth and thereby to meet society's urgent needs and demands, it may be observed that the task will be hardest at the two ends of the ability scale. Low-ability students will have more and more difficulty in holding their own in an increasingly technological society. It is upon them that the most dreadful burdens of unemployment will fall; they will need an education which will ward off frustration in situations where frustration is almost inevitable. Society's task of caring for low-ability unemployables may, in decades not too distant, be severe. With this task the schools of a democracy will be intimately concerned.

However, at present it is the small group at the other end of the scale that gives us most concern. The few geniuses produced in any society are particularly needed in a society such as ours. The ingen-



ious able who can push back the frontiers of knowledge, especially the outstandingly able leaders with "wrap-around" vision, are in short supply. Moreover, our ordinary educational procedures are less likely to develop their top-flight abilities than we like to admit. We have not learned how to develop fully, for the social good, the genius that resides in a few. The need for socially sensitive genius is urgent in a society which is as broken into specialties as ours is. Leaders who can orchestrate the diversities of modern life are particularly needed. Yet the talent of the upper 1 per cent of our youth is too frequently uncultivated or is by no means cultivated to its fullest. The education of geniuses in a society which needs their genius is a paramount task too long left to chance.

The education of genius, however, is only one part of the education of the gifted. America today needs all the high-level ability latent in its young—and education should meet that need both for reasons of the democratic ideal and for reasons of the manpower urgency. Every student of education knows the problems and difficulties of educating the gifted; most educators will agree that we have, in a certain sense, neglected the education of the gifted in recent decades in American schools and colleges. The manpower situation impels us to consideration of that neglected task.

In order to produce the level of educated manpower now demanded, schools must identify very able students at an early age, must enrich their school and college programs, must adequately challenge and motivate such students, and must give them a sense of society, a social consciousness, which is compatible with democratic ideas. All of this calls for adjustments in the curriculum and in methods of teaching. It also calls for increased skill in measuring abilities and for counseling programs which will motivate as well as guide. It requires the removal of economic obstacles to the full training of ability, probably by scholarship programs and the extension of free education beyond the high-school level.

Within the school program there should be a resurgence of experimentation with individualized assignment procedures and with possibilities for curriculum enrichment. The availability of visual and

auditory aids to learning—indeed, the influence of mass media on pupils outside the schools—increases the potentialities for effective enrichment of instruction on an individualized basis. Every teacher of every subject should intensify his interest along these lines.

It is also likely that we shall witness shortly a resurgence of experimentation with ability grouping. While the separation of the able from the less able and the isolation of either group in special schools does not seem desirable or defensible, an increased degree of ability grouping within the comprehensive school is probably desirable. Much of the success of extra-curriculum activities, as in music or dramatics or debating or athletics, is due to ability grouping within those fields. The same degree of ability grouping in activities calling for intellectual operation is desirable—and is in no sense undemocratic.

Ability grouping need not permeate the entire school curriculum. Recently I heard of one high school, with an enrolment of about six hundred pupils, which set up honors classes in a number of curriculum fields, such as science, social studies, and literature. Each honors class was open only to Seniors; each was restricted to ten pupils; each was given freedom, with a good teacher, to make its own program. The stimulation and intellectual excitement of these groups was so great that the prestige of the honors classes soon equaled the prestige of the football team. Able pupils, from their first weeks in the school, began to work for entrance into a Senior honors class. The honors classes did college-level work, and their existence raised the whole intellectual level of the school.

Whatever the means developed, it is urgent that schools challenge abilities, especially upper-level abilities, to the fullest. Every factor in the manpower situation attests to this fact. Upgrading of the labor force and upgrading of civic behavior in America rest upon an upgrading of education. While this upgrading must touch the full range of human abilities, it is particularly urgent for the upper-abilities groups. This is the major implication for education of today's manpower situation in the United States.

## *Identifying Gifted Children*

Suppose a teacher is casually observing the children passing by in the hallway on their way to their classrooms. Approximately one out of ten of the children passing before his gaze has sufficient mental ability to be designated as "gifted" and in need of special educational opportunities to develop his ability; another one out of ten has artistic ability that warrants the provision of special educational programs; still another one out of ten has unusual musical ability; and similar ratios of the children have dramatic talent, creative writing ability, mechanical skills. Many children have two or three talents that place them in the upper 10 per cent of their age group. By the time five hundred children have passed by the teacher, he will have looked at approximately one hundred who can be considered gifted in at least one important way.

The teacher would not be able, by casual observation only, to distinguish the gifted pupils from the others. The gifted are not staggering under a towering load of books. Neither are they blundering along the fringes of the group trying unsuccessfully to "get in" with other children, as is sometimes supposed to be true of them. On the contrary, they are quite as carefree and as well adjusted as any children in the hallway; hence the need for inaugurating methods of identifying them.

Identification consists in the process of screening children by means of standardized test procedures and/or observational methods and selecting the superior children for educational programs designed particularly for them. The purpose of the procedure is to

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enable educators to decide whether special educational provisions should be made for a given child and, if so, what kind of special opportunities should be provided. The purpose is not to tie on the child a tag that will stay with him the rest of his life, for better or for worse. Neither is identification a goal in itself. It is a means to the goal of getting each gifted child into the educational program most suited to develop his capacities and his whole person.

Procedures for identifying gifted children should be functional, systematic, and inclusive. The identification procedures should be geared into the over-all testing program of the school. All the children should be tested at regular intervals with a wide range of tests so that numerous kinds of abilities can be found. Without this kind of identification program, it is likely that a considerable number of able children will be overlooked.

Additional benefits accrue to the school system that employs systematic, inclusive identification procedures. Since many of the screening devices used to discover gifted children are inherently stimulating to all children, they enhance the instructional program in the classroom. For example, teachers and children so enjoy some of the fine-arts tests that they want to continue them long after the testing period is concluded. The procedures of identification help to tailor the educational program to fit the particular combination of abilities of each gifted child by providing indispensable information about him. Almost invariably, a good identification program stimulates teachers and administrators to do something for the children they have identified.

A good identification program should discover other characteristics of gifted children besides their aptitudes and capacities. The *interests* of gifted children are important in a program for these children. "Interests" are any activities in which the child prefers to engage when given a free choice. These interests often point to activities which will motivate a pupil, and they can sometimes be used as a springboard to extend his participation into other activities.

Another important kind of information to have about gifted chil-

dren is their academic achievement, the level at which they are successfully performing on specific learning tasks.

Other factors, such as *motivation*, *personality*, and *social* factors, can and should be tested and observed in order to round out the picture of a given child and to provide important leads for his educational program. In this connection it is important to assess such personality factors as the amount of withdrawal or aggression in a child's behavior. If the child is extreme in either of these behaviors, his aptitudes may never show through enough to be recognized and appreciated. Social factors, too, are important. Some children from lower social and economic groups and from certain racial groups may be so deprived of cultural stimulation in their homes and neighborhoods that their potential aptitudes are present only to the most observant eyes.

Two general approaches can be used to identify gifted children: standardized tests and systematic observations. Some abilities are best identified by use of objective tests; others can better be discovered through observations; and still others need an approach combining both methods. Some educators prefer one approach over the other, but, in general, best results are obtained from a maximum use of both. An example of the intensive use of both approaches is found in the Youth Development Project carried on in Quincy, Illinois (1).

Of the many kinds of standardized tests now available, one of the most familiar is the standardized group intelligence test. Tests of this type are particularly valuable for the first rough screening. It is important to administer these tests fairly regularly in the school career of a given child. Some school systems give group intelligence tests every two or three years. Additional information about the intellectual level of a child can be gained by use of individual intelligence tests. The individual test usually gives a more reliable measure of intelligence than does a group test, and hence increases the confidence in the accuracy of the identification procedures. Some

schools routinely examine all candidates for special classes for the gifted with an individual intelligence test.

Tests of specialized abilities will supply a fuller understanding of an individual pupil or will select pupils for certain specialized courses. There are standardized tests of such skills as clerical ability, mechanical aptitude, and some kinds of motor aptitudes. Their usefulness is much more limited in the education of gifted children than the tests of intellectual abilities.

Many kinds of interest inventories are available for use in an identification program. Some inventories inquire directly into the child's interests. Others are more indirect, using incomplete sentences which the child completes. Still other interest inventories ask the child to list his activities both in school and out of school. Vocational interests are of great importance, for adolescent boys in particular, and vocational-interest inventories can be used to discover those interests.

Achievement tests are probably the most commonly used of any kind of educational test. In addition to measuring achievement in reading, spelling, arithmetic, language, and science, they may be used to discover academic disabilities of gifted children and to point the way for remedial work or special emphasis in teaching.

Since personality factors are often taken into account in selecting pupils, personality tests are important in an identification program. These tests also yield supplementary data which can be used in counseling and guiding children in planning their educational program.

Abilities in the fine arts can best be identified by a method which combines some features of standardized tests and some aspects of personal observations. This method consists in obtaining a "work sample," which is rated for excellence by a panel of expert judges. Such a method probably provides the best procedure available for screening youngsters with aptitudes in the fine arts—graphic arts, music, writing, dramatics, dancing, and mechanics.

The "work-sample" method has been developed primarily in the pilot schools participating in the gifted-child program in Portland,



Oregon. Procedures are used to discover children with abilities in art, creative writing, music, dramatics, physical aptitudes, and mechanical skills. The intent of the procedures is to identify the most talented pupils (the upper 10 per cent) in each of the fine arts.

The procedure for screening children with creative writing ability will illustrate how such procedures are used in the other fine arts as well. The creative writing exercises are designed for fifth- and sixth-grade classes. Five such exercises are given, one each week for a period of five weeks. Each exercise is completed in one school period. Discussions and comments are avoided once the class has begun to work on the exercises. The exercises are (1) developing expressive sentences, (2) developing a paragraph from a stimulus sentence, (3) writing a story from descriptive phrases, (4) describing a real-life experience, and (5) writing an imaginative composition.

The written products are rated by the classroom teachers on a five-point scale according to criteria previously given them. Teachers are asked to look for creative thought and expression rather than excellence in the mechanics of writing. They are told that the number of creatively gifted children in a classroom may vary from one to seven or eight but that, as a general rule, there will be from one to three. The papers are judged on the following criteria: originality of ideas, depth of understanding of emotional situation, choice of expressive words, conciseness of expression, developmental logic present in sentences, good paragraph development (when appropriate), well-planned plot (when appropriate), maintenance of a point of view.

Talents in the other fine arts and in practical skills such as mechanics can be identified by this basic method of having a group of experts judge the products of the children. The product must be obtained from the children under as standardized conditions as possible. The experts can work singly or as a panel. It is important that they be given training in what to look for and objective criteria by which to judge the level of performance of each child.

In addition to the standardized tests of intelligence and the semi-standardized tests in the fine arts described above, observation is an important method for identifying able children. The role of human observation and judgment in screening and selecting is a major one. Almost every program of identification includes teacher observations and judgments among the procedures (2).

Teachers' observations and judgments are particularly appropriate for identifying children's talents that are expressed rather consistently but not necessarily intensively. Examples of such talents are leadership and friendship, which can be observed in children every day. Most teachers, moreover, can readily observe a wide variety of talents as children engage in the many kinds of educational experiences provided in the classroom. Teacher judgments can also be used to identify talents of types for which good tests are not available and to corroborate and correct the evidence obtained from the results of standardized tests.

For the most effective use of teachers' observations as talent-identifying procedures, teachers should be provided with behavioral descriptions of children's characteristics that are valid clues to the talent for which he is looking. More reliable results are obtained when a teacher observes many specific behaviors related to a given talent than when he makes a global, over-all judgment about a child's abilities. The latter method covers up many specifics that, if noted, help make the teacher's judgment reliable. Some school systems have set up guides for teachers to follow in making observations, which present descriptions of behavioral characteristics for all important varieties of talent as well as for scientific and intellectual abilities (3). A modified forced-choice instrument called the Behavior Description Chart was used in Quincy, Illinois, to aid the teachers in identifying ability in social leadership (1: 24-32). The instrument presented eighteen groups of five items in each group, and the teacher was asked to mark the item among the five which was *most like* and the one which was *least like* the child under consideration.

Given this kind of guidance and training in observing, teachers

may become adept in recognizing and identifying children with unusual abilities of many kinds. One of the important bonus benefits obtained from teachers' observations is that observation tends to make the teachers more sensitive to individual differences in children and more aware of giftedness.

Another source of systematic data for screening purposes is children's observations of one another. Because of their contacts in situations quite removed from the classroom, children can provide information that is ordinarily unavailable to the teacher. These observations by youngsters can best be obtained by familiar sociometric devices. Children can be asked to identify almost any talent or aptitude that a teacher wishes to discover, from intellectual ability to mechanical aptitude to social leadership. The teacher needs only to present the children with descriptions of behaviors which it is possible for them to observe and behaviors which are truly symptomatic of the talents he wishes to identify.

Probably no one knows as much about a given child as do his parents. However, parents' knowledge is often unsystematized and unevaluated. Parents rarely have any way to judge the quality of the ability of their children and hence may be likely to make large errors. Nevertheless, the information that parents have about their children supplies valuable supplementary data to corroborate the results of tests and teachers' observations or to provide decisive information in some borderline cases where tests and observations are inconclusive. Information from parents' observations can be obtained through conferences or by means of questionnaires.

Screening is an ongoing process that is never completely finished. Even if the identification procedures used in elementary schools are adequate, efforts to identify gifted children should be continued in the secondary schools. It may happen, for instance, that a pupil needs the combination of physical and social maturation, interesting high-school curriculum, and masterful teaching to motivate him to put forth his best efforts in a given endeavor. This combination of

circumstances may be missing from the lives of a significant number of pupils until they reach high school or even college. It is important for high-school teachers and guidance counselors to use the information that was obtained in the elementary school. Data gathered in an identification program should not be allowed to gather dust.

The names of all the children selected as gifted should be drawn together on a master roster. This represents the group for whom special provisions are to be made. An individual card should be set up for each selected child, summarizing the test results and the special provisions made for him. The card should follow the child throughout his school career. Test information can be used judiciously for guidance of the child, his teachers, and parents.

This article has described the main outlines of a total program for identification of gifted children. If such a program is inaugurated in a school, the teacher standing in a hallway watching the children pass by will be able to recognize the one-in-ten who has intellectual ability. The teacher will know the pattern of the able child's ability, his interests, and his personality characteristics. The teacher will also be able to point out other talented children and to give some account of their aptitudes, their interests, their achievement. Such identification of gifted children and knowledge about them are indispensable if teachers are to provide the kinds of special programs needed to develop the capabilities of gifted children to the fullest extent.

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## *Initiating an Educational Program for the Able Students in the Secondary School*

Educators and the lay public are, by now, fairly well agreed that appropriate education should be provided for gifted students. The question becomes, then: How can a school plan and carry out its own educational scheme for suitable education of its ablest students?

An experimental program, the School and College Study of Admission with Advanced Standing, which I had the privilege to direct, may help to answer this question. The study was designed to revise the content and teaching in secondary schools in order to make more adequate provision for the education of very able boys and girls than even the best schools had, even in their "honors" course, devised. Out of the propositions and procedures of this experiment has developed the Advanced Placement Program of the College Entrance Examination Board and the initiation of specific courses of study and teaching methods in a considerable number of independent and public secondary schools throughout the country.

The School and College Study of Admission with Advanced Standing originated in discussions held by the faculty of Kenyon College in 1951 regarding the possible revision of requirements for the Bachelor's degree in order to encourage able students in strong secondary schools to pursue a liberal arts education at a pace appropriate to their ability and their teachers' interests and skills. The study was formally organized when the late President Gordon K. Chalmers, of

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Kenyon College, and a group of presidents and deans of twelve colleges formed a Committee on Admission with Advanced Standing and presented a preliminary design of the experiment to the Fund for the Advancement of Education. Aided by a generous grant from the Fund, the committee enlarged its membership to include twelve headmasters, principals, and school superintendents and organized as the Central Committee of the School and College Study of Admission with Advanced Standing. The twelve colleges of the study were Bowdoin College, Brown University, Carleton College, Haverford College, Kenyon College, Massachusetts Institute of Technology, Middlebury College, Oberlin College, Swarthmore College, Wabash College, Wesleyan University, and Williams College.

The Study was founded on three basic assumptions about American education: (1) that for the able student the American system wastes time, (2) that the best place for a school-age boy or girl is school, and (3) that the best teachers of adolescent boys and girls are to be found in the secondary schools. The schools and colleges of the Study agreed that acceleration of able students into college after two or three years of high school is generally less desirable than enrichment of teaching in the high school and admission to college with advanced standing at the normal entering age. The Central Committee took the position that American education could be substantially improved by strengthening the secondary schools and that this could best be done by offering the schools an opportunity to qualify their ablest graduates for advanced placement in college. Acting on these assumptions, the central purpose of the Study has been to assist schools in planning and teaching courses in eleven subjects conventionally taught at the college Freshman level in order that able high-school students and their teachers might address themselves to tasks more commensurate with their powers than present practice requires.

After more than a year of study by the Central Committee, by a Committee of Individual Development (concerned with the student himself), and by eleven subject-matter committees, twelve reports

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were printed (1) and circulated to the faculties of the twelve colleges. In the autumn of 1953 the faculties of all twelve colleges voted approval of an experimental plan to consider for admission with advanced credit able students who had received intensive instruction at the high-school level and who had met the standard of the advanced examinations to be given in May, 1954.

In the fall of 1953 eighteen schools associated with the Study indicated their readiness and intentions to present candidates for the Study's first series of experimental examinations. Seven pilot schools, which had volunteered in the early spring of 1953 to undertake studies in the problems of selection of students and scheduling of special classes, were able to introduce revised courses in September, 1953, for groups of their ablest students. The Study contracted with the Educational Testing Service to administer the examinations in the experimental schools and to selected "sampling" groups of Freshmen in the twelve colleges in May, 1954. Except in a few subjects, the numbers of examinations involved cannot be regarded as statistically significant, but it is a fair general conclusion to say that, in the first year of school-course revision and improvisation, the school candidates made a creditable showing.

The experience of the School and College Study and the impressive arguments of the Andover Report, *General Education in School and College* (2), led to a collaborative effort on the part of the Study and the officers of the College Entrance Examination Board to explore the possibilities of extending the experiment. The Committee on Examinations and the Executive Committee of the College Entrance Examination Board presented, at the October, 1954, meeting of CEEB, a proposal for a series of advanced examinations, following initially the Study's definitions and general design, to be given by the College Board in late spring of 1956. The proposal was approved by the College Board membership.

The May, 1955, series of advanced examinations, the last designed and administered under the supervision of the Study, was set for May 9-20, 1955, and was given to school candidates only. The gen-

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eral result pointed to the necessity for further association of school and college teachers to clarify standards and aims and to reach an understanding of mutual responsibility in developing appropriate teaching of the ablest students in school and college.

In May, 1956, the College Entrance Examination Board administered its first series of advanced placement examinations in twelve subjects, the ten of our original Study and two additional examinations, one in American history and one in European history. At the time of the administration of the examinations to 1,224 candidates from 110 secondary schools, they were also administered to control groups of college students completing their first year in the various subjects. This is the practice that we had followed in our first series of examinations under the Study. The Commission on Advanced Placement, which met at the College Board offices last October, was informed that, as of the autumn of 1956, some four hundred schools have indicated that they will send candidates into the May, 1957, advanced placement examinations, and we anticipate a total candidate list of probably twenty-five hundred. It is obvious that the program of advanced courses in high schools for able students has been spreading very satisfactorily and that the program has received the indorsement of students, teachers, and parents in many communities.

But what have the problems been, and how do you get a program of intensive college-level work into the secondary school? What are some of the conditions which must be met in order to institute a revision of the high-school curriculum sufficiently deep and significant to measure up to the standards set by the School and College Study and the Advanced Placement Program of the College Entrance Examination Board?

The first condition is that the faculty and the administration of a school believe that a program of more intensive work in the secondary school, in specific subject matter, is worth while, is educationally sound, and is indeed necessary for the proper education of its ablest students. At the very least, the faculty and the administration, and

the board of education, must be willing to experiment. A school must be ready to concede at the outset that it has not been doing a good enough job with its ablest students and that the ablest students are not to be left to themselves to develop enriched programs on their own initiative. The school must be persuaded that it has a very serious obligation, a social obligation, to stretch the minds of these students. It must accept the proposition that for the able student our secondary schools have wasted time—and they have wasted it, even when they have presumably given honors-level work in the secondary school, because the honors-level work, good as some of it has been, has not been truly commensurate with the abilities of the ablest students. The school also must approach an experiment in intensive college Freshman level work with the clear conviction that the aim of the experiment is not to accelerate the bright, not to coach or to tutor the bright students to jump through higher hoops, but is to provide a kind of teaching which shall, by its depth as well as its breadth, truly challenge the mind and the character of the student and the best resources and imagination of the teachers.

The second prerequisite to a school's initiating a program of this type is a willingness to establish certain conditions of method and scheduling by which our experimental schools, at least, have demonstrated the experiment can be successfully carried out. One of the conditions is that the ablest students be segregated in special groups. These intensive courses cannot best be given, we think, by way of individual enrichment and private arrangements in a heterogeneous class. The ablest students, we have found, must be put in special physics classes, special mathematics classes, special English classes. Moreover, the teaching load for teachers of these small special groups must be lighter than ordinary. A teacher should, we think, teach no more than four classes, one of which will be the advanced course. Time must be provided for the teacher's preparation for the class, for conferences with the students. Obviously the necessities for special classes and special teaching assignments raise problems of cost and problems associated with student population. It is expensive to run

a class in college physics enrolling only 12-14 students; in the educational budget this is an "uneconomical unit." Of course we run many uneconomical units for the slow learners and the handicapped, and I think some defense might be made for running an uneconomical unit or two, or a considerable number of them, for the ablest students. In terms of teacher time, the costs are at least one teacher for every five advanced classes. Additional costs will be involved in the purchase of books, and, for science courses, in some rather expensive laboratory equipment of the college laboratory type.

Another condition for starting such a program in the secondary school is the availability of a sufficient number of well-qualified teachers—teachers well enough trained in their own subject matter at the graduate level to handle intensive work in the advanced courses. How many teachers does the school have who are competent to teach calculus and analytical geometry (with side references to modern algebras)? How many teachers does the school have, or does it have any, who are competent to give college-level courses in chemistry and physics, or in English and in European history, or the fifth year of Latin or of the modern languages? A considerable amount of retraining of the teachers may be necessary.

So far as the school population is concerned, a basic consideration is how many students really can qualify for these advanced courses. Is the school large enough in total enrolment to allow for a flexible sectioning of these students? The large secondary school obviously has a very real advantage in this respect. It is possible in the larger school to do the kind of ability grouping which, we think, is absolutely necessary for the proper initiation of this program. Small schools will find it rather difficult, but not impossible, and adaptations, I am sure, can be made for the fewer number of the ablest, even if by private arrangements and not full-scale course work.

The third major cluster of problems arises in the matter of the selection of students and teachers for these courses. How are the students selected? When are they selected? What teachers are to be assigned to these special groups? In our four-year high schools in the

Study, we found that it was possible to select students for the advanced courses at the end of the first year of high school. In the seven pilot schools the following criteria were generally used:

1. Past scholastic achievement, which included all the data we could get on the students through elementary school and the first year of high school.
2. Recommendation by previous instructors and departmental chairmen.
3. Objective data, such as aptitude tests and intelligence-quotient scores, with no great dependence upon the intelligence quotient in a literal way (3).
4. A review of anecdotal data from guidance officers and counselors. We made an attempt to screen our candidates for the courses, not merely on the basis of proved academic ability, demonstrated aptitude, or intelligence quotient, but also with full consideration of emotional and temperamental factors and physical health.
5. Parental approval. This was obtained in some schools simply by a conference with the parent, with strong urging by counselors or teachers that the student be allowed to enter the program. We also allowed some students whose parents were pressing for their admission to the program to enter on a probationary basis, if there was any indication that the students might be able to encompass the work.

The selection of the teachers is, on the whole, less difficult. Some of our teachers were obviously not prepared to undertake this type of work. Others who presumably were prepared were often not eager to undertake the work. Often, then, the selection of the teachers was largely a self-selecting process, although the principal was, of course, responsible for making the best choices which his judgment made possible. In general, no conspicuous conflicts arose in our schools when selections were made. It was gratifying, at times even inspiring, to see how readily a faculty was willing to concede that its outstanding teachers were outstanding and that the assignments which they received or elected were deserved. The enthusiasm of the teachers was, I think, the basic factor in the selection. No teacher, to my knowledge, was pressed into doing this; none who finally taught an advanced course had to be "sold" the idea of doing it. Many who became most successful in the program volunteered for what was, and is, a really arduous task, although at the same time a great delight. The teachers who have had the experience of teaching these courses to the ablest students have been tremendously en-

thusiastic, and their enthusiasm and, in very large degree, their new approaches to content and teaching methods have had a salutary, contagious effect upon the teaching staffs.

A fourth set of difficulties or problems arises in terms of the specific subject matters. It is obviously easier to introduce advanced work in some courses than in others. The subjects which ordinarily offer four-year sequences or have the possibility of being presented as four-year sequences in the high school are a good deal easier to adapt to the necessities of rigorous work in the Senior year. It is somewhat easier, for example, to plan a four-year program in English, or a three-year program beginning with the Sophomore year and working toward a college-level course in the Senior year, than it is to plan a Senior-year course in physics, let us say, which shall be a college year of physics. The science courses, being one-year courses, are difficult to adapt without expanding the time, although some of our schools, in the early stages of our experiment, simply took their ablest boys and girls and gave them college physics instead of high-school physics in the Senior year.

The experience of the schools in the revision of the mathematics curriculum has been most interesting and stimulating. Our mathematics teachers in the schools, following the syllabus of the Advanced Placement Program, have found a refreshing change possible in the sequence of mathematics from the second year on. Currently, for example, New Trier Township High School has a group of students who as Sophomores began in September, 1955, in an advanced mathematics course with plane and solid geometry, taught together, and who are now taking college algebra and trigonometry in the Junior year and anticipate a Senior year of the calculus and analytical geometry.

The difficulties of initiating the program in foreign languages are obvious. In a time when few students are inclined to take four years of a language, it is difficult to present a program which will encompass five years. There is also the problem of deciding whether to offer the full-scale advanced program in all four languages (assum-



ing that you give Latin, French, German, and Spanish and can teach them through four high-school years) or whether you will concentrate on Latin and French, or on French and German, or on Spanish and French, or whatever combination, or on only one language.

The problem in history is somewhat related to that of the sciences, since the sequence in history ordinarily does not obtain and the elections which are made at the second year often show a conflict between biology and modern European history, for example. Most of the schools with which I am acquainted have decided that they will undertake the American history sequence, giving a high-school American history course at the Junior level and following it in the Senior year with a really intensive course in American history centered on major trends and problems. Some schools with particularly able, stimulating, and interested teachers of European history have called upon those teachers for the intensive courses in that subject.

Anyone who has had any experience in an English department in either school or college will not be surprised to hear that the most difficult adaptation of all is to design a Senior year of English which will resemble some course or courses at the college level. The college English departments have not quite decided yet, in the twenty years after my first associations with one, what they really want to do in Freshman English. There is no general agreement on the objectives of the English literature content vis-à-vis the requirements in English composition. It will take a good deal more conferring and frank discussion between school and college teachers of English to work out areas of agreement which will be helpful in revising English instruction in the secondary school.

Before leaving the conglomerate problems of subject-matter adaptations, I wish to point out that the emphasis in all these courses should properly be not on quantity but on quality. When the intensive courses were first being discussed by high-school faculties, a number of teachers gained the impression that this was an invitation to pile on the work, to require large amounts of reading, to require long, long hours of homework. This is certainly not the spirit of the

School and College Study, and it is educationally unsound. The emphasis in the intensive courses is upon the quality of the response, the quality of the expectations. The objective of an intensive course is not busyness but a depth and a mastery of the subject matter that goes beyond mere memorization or static control of the knowledge. The question of suitable objectives is a matter for careful examination and reflection on the part of any teacher who wishes to commit himself to this kind of teaching. As a consequence of such mature reflection, the teaching in other classes in the school may be significantly influenced by the thoughtful teacher of the intensive courses, since his assignment requires him to take an entirely new, a most deliberate, and a carefully planned approach to the problem of teaching the advanced content.

Among other effects and consequences of the introduction of advanced courses at the secondary-school level, there has been some uneasiness in the schools about the possible restriction upon a student's extra-curriculum activities and the stigma which may attach to any student's being classified conspicuously as a "brain." So far as the interference of intellectual matters with an able student's emotional and social growth is concerned, the evidence of the schools so far involved in advanced work clearly is that these "intellectuals" continue to stand out in extra-curriculum work. The introduction of advanced courses has not resulted in a conversion of able boys and girls into dull "grinds" with no interest in the total life of the school. As a matter of fact, the intellectual leaders of the schools apparently continue to be the leaders in many other activities also.

In summary, I do not think that anyone who was associated with the School and College Study or who is now associated with the College Entrance Examination Board's Advanced Placement Program would say that our approach to the education of the ablest students in the secondary schools is the only approach. Neither would we contend that the objective of this approach generally is acceleration or an attempt to cut the four-year college program to three

years, although acceleration is always a possible outcome of intensive work at the secondary-school level with advanced credit at the college level. In terms of its effects on students and teachers, our program has demonstrated itself to be one of the most lively, stimulating, and profitable programs of secondary education that I have observed in recent years. It is committed to subject matter; it is committed to an imaginative qualitative upgrading of teaching; it is committed to a basic faith in the necessity for patient effort in learning; and, perhaps most significant of all, it works. Its most enthusiastic supporters are the students and the teachers, in school and college, who have participated in it. There is a sparkle in their eyes when they talk about the rewards of hard study, and they have no shame when told that their academic bias is showing.

#### NOTES

1. *Reports of Committees, 1952-53* (Philadelphia: Central Committee, School and College Study of Admission with Advanced Standing [% Central High School], 1953). This publication was later revised and condensed in the bulletin, *College Admission with Advanced Standing: Announcement and Bulletin of Information* (Philadelphia: School and College Study of Admission with Advanced Standing [% Central High School], January, 1954). The latter contains the syllabi of courses and specimen examinations.

The latter publication was the basis of the booklet, *Advanced Placement Tests: Bulletin of Information* (New York: College Entrance Examination Board, October, 1955). The School and College Study recommends this publication to those who wish to read descriptions of the level and standard of work expected of candidates applying for advanced credit under conditions originally defined by the Study.

2. *General Education in School and College*. A Committee Report by Members of the Faculties of Andover, Exeter, Lawrenceville, Harvard, Princeton, and Yale. Cambridge, Massachusetts: Harvard University Press, 1952.

3. In the course of our experiment we found people of what we would consider marginal intelligence-quotient level doing as well as those with the higher intelligence quotients. But, on the whole, probably the intelligence-quotient range of our ablest students represented nationally the top 1 or 2 per cent of the school population. This proportion would vary from school to school. In some schools it might be the top 5 per cent; in some, the top 10 per cent; in some, as low as 1 or 2 per cent, of the total school population.

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## *Social Values and Individual Motives: The Dilemma of the Gifted*

Exceptional children are coming to be looked upon, not as individuals of special abilities to be given freedom and opportunity for their own self-realization, but as a source of *manpower*—manpower that is fair game for training, stockpiling, and directing, if not conscripting, into the service of efficiency and production. To be sure, this attitude is frequently expressed as the establishment of “early career lines.” But Karl T. Compton, of the Massachusetts Institute of Technology, expressed the point of view more bluntly when he said: “Do we have, or can we get, the engineers we need? The problem is . . . just as important to the national safety as the stockpile of critical materials” (1: 9).

In response to this type of exhortation, there has been a notable increase in the direct and indirect pressures on our gifted to undertake *training* in a specific discipline, most frequently science and engineering, rather than *learning* in the broad fields of human wisdom. Most recently this pressure has been exerted not only at the graduate, but at the undergraduate, level as well. The New York State Board of Regents, for example, in 1956 inaugurated a program of five hundred scholarships of \$500 each for high-school graduates who chose to enter the fields of science or engineering. No similar program was inaugurated for equally gifted students who chose the field of literature, say, or philosophy. In fact, one condition of the scholarship as it now stands is that a student who changes his major from engineering or scientific studies may forfeit the scholarship. One may properly ask: Is there not a danger that such unequal dis-

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tribution of scholarship funds and pressures may seduce our gifted into the technologies, not because they want technology, but because they need the money if they are to enter and remain in college at all?

Indeed, there are those who would maintain that the "training" rather than "learning" emphasis into which we may be drifting (an emphasis which is only one symptom of what we may call the "Manpower concept of education") is indenturing our best brains to drafting-rooms and to research and development time clocks without considering the consequences of such *occupational segregation* on the gifted individuals themselves and on our culture. To be sure, we are not conscripting our gifted into particular disciplines by force, as an authoritarian people might do, but, in a sense, we are conscripting them by other pressures, including money.

It is no accident that the concept of Manpower applied to education should bring to my mind a military image. In December, 1945, the United States was host to 370,000 prisoners of war of authoritarian ideology. The problem was raised in the Prisoner of War Special Projects Division as to what was the single most significant fact to tell these prisoners of war regarding democracy, not as a political system, but as a way of life and a pattern of values different from the one to which they were accustomed. Here is what the Special Projects Division came up with: "The Democratic Way of Life' assumes as its basic postulate that all men can, and in the long run will, voluntarily choose those courses of action that are most advantageous to them individually and collectively, if all are given full opportunity to choose" (2: 231).

This concept of the human being as a free agent, the lord of society and not its slave, stands in sharp contrast to the Manpower concept. As Kenneth Boulding says:

[The Manpower concept] contemplates society as having a single well-defined end which is to be pursued with *efficiency*. Society is conceived as a great machine, feeding Manpower in at one end and grinding out maximum quantities of the Single Well-defined End . . . at the other. . . .

Man as Manpower is all very well for a slave society, where man is a domestic animal, to be used for ends which are alien to him. But in a free society man is

not manpower. . . . He is a free being, the lord of society and not its slave [3: 11-12].

It is a tragic paradox that, ten years after having made the distinction between Man and Manpower clear to our prisoners of war and to the world at large, and having pointed out vividly the moral and practical superiority of the concept of Man over the concept of Manpower, we now find ourselves in the dilemma of applying the concept Manpower to the self-realization of man in our own society. This paradox cannot be understood outside the value framework of present-day America. For the motives of an individual in a society cannot be understood outside the value system of that society.

It is in the context of what is occurring in our value system that our present concern with the gifted and the nature of the proposed solutions to the problem take on special meaning. As I have tried to show elsewhere (4), perhaps the most significant feature of our life today is the rapidly changing character of our operating values. And I am arguing that one aspect of this transformation is the subtle shift in our attitude toward the individual from the concept of Man to the concept of Manpower.

This shift in values, these values in flux, places all of us (but especially the gifted person) in an anomalous position. If the gifted individual is to be productive and innovative, the culture must encourage, or at least be receptive to, personal independence and autonomy. But our emerging values tend to reward conformity and cheerful compliance with the status quo. If the gifted person is to realize his endowment and potentialities, he must be motivated to work hard and sacrifice present ease for future achievement. But our values tend to prize sociability and hedonistic present-time criteria of worth. If he is to express his exceptional talents (and, by definition, the gifted person is exceptional), he must be able to maintain firm commitment to his own standards and to his own beliefs. But again our emerging values are quite opposed to this; they tend instead to hold in esteem relativistic attitudes without strong personal commitments.

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To be sure, talented people have always disturbed the statistical equilibrium of normalcy and have themselves been confounded, in turn, by the conventional standards of their culture. I suspect that by the very nature of things this is inevitable up to a point. But the dilemma of the gifted in our time seems to me especially critical. For one thing, the discrepancy between the individual motives necessary for exceptional behavior and the social values that might support such behavior appears to be steadily increasing. For another, this discrepancy is in a fair way of being exacerbated by the very measures we are taking to alleviate it. We appear to be drifting to a Manpower concept of the individual and a Manpower concept of education, at least where the gifted are concerned. We are attempting to implement the paradox of applying the concept of Manpower to the self-realization of man. Early career lines, orderly training in narrow disciplines, stockpiles and stockpiles of engineers—these may give us a comfortable sense of neatness and security. But, last time out, the concept of the individual as Manpower got quite a licking from the concept of the individual as Man. I like to think that thus it ought to be, and thus it always will be. And so whether it be education in general or education of the gifted, I prefer to say with Kenneth Boulding: not Manpower, but Men—men in their infinite variety and complex personalities, in the unfolding of their desires and the unfettered expression of their *own* talents and of *all* their talents.

## NOTES

1. K. T. Compton, "Engineers," *Scientific American*, CLXXXV (September, 1951), 9-12.
2. E. Casady, "The Basic Assumptions of Democracy as Presented to German POW's," in *Conflicts of Power in Modern Culture: Seventh Symposium of the Conference on Science, Philosophy and Religion*. Edited by L. Bryson and Others. New York: Harper & Bros., 1947.
3. K. E. Boulding, "An Economist's View of the Manpower Concept," in National Manpower Council, *Proceedings of a Conference on the Utilization of Scientific and Professional Manpower*, pp. 11-26. New York: Columbia University Press, 1954.
4. See my article "Changing Values Challenge the Schools" in this issue of the *School Review*.

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## *Some Crucial Problems of Mathematical Instruction in the United States*

Mathematical education the world over is entering into a critical period. There are three major factors which operate to produce the crisis: the rapid expansion of mathematical knowledge itself, the impressive penetration of mathematical thinking into the most diverse branches of learning and technology, and the universal desire to establish mass education at the elementary and even the secondary levels.

In the United States the crisis has been produced mainly by the first two factors, since this country, in contrast to most others, had long ago succeeded in establishing free public education for all through the secondary, or high-school, level. Our problems, therefore, are in many respects far less formidable than those faced by the numerous countries of the world which are still a long way from achieving the first goal of universal, free, and compulsory elementary-school education. Nevertheless, the extent to which we share these problems with the rest of the world was brought home to me in a rather striking way when I began adapting this article from an address delivered in Bombay in February, 1956, before the South Asian Conference on Mathematical Education (1). I have changed the title by adding the words "in the United States"; I have made a few omissions here and there; and I have added a few lines treating some special American problems which would not have been of great interest to my audience in Bombay. Most of what I said there could stand unchanged and has not been touched in the course of the adaptation.

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We in this country are now acutely aware of the rising pressure to teach more mathematics to more young men and young women, at every level of education. We know that in the immediate future we must deal not only with a greater number of students but also with a wider spread of mathematical ability (particularly in our colleges and universities) and with an expanding circle of individual interests. We are beginning to realize that, within the framework of our system of universal education, our high schools must undertake those overdue adjustments which will enable them to teach to a larger number of students the basic modern mathematics on which our science and our technology are founded.

It will be good if we can, from the beginning, recognize quite frankly the essential nature of the problems with which we have to deal. We must see that they are inseparable from the progressivism of Western culture, now in the process of spreading to the entire world. Most cultures of which we have anything like an adequate knowledge appear to have been strongly conservative and essentially inimical to rapid, radical, or extensive change. The cultures of ancient Egypt and ancient China, notable for their stability and their millennial vigor, offer conspicuous if extreme examples of this general observation. On the other hand, human societies do not exhibit those extraordinarily rigid patterns found in certain insect societies; in even the most conservative of them cultural change takes place slowly and in small quanta, with cumulative effects which eventually can be identified as significant. Greek culture and its derivative, modern Western culture, stand out by contrast because of their eager and systematic search for new ways of thinking and doing. This characteristic progressivism is expressed materially in the advances of modern technology, but it is essentially an intellectual phenomenon, as can be seen in the growth of scholarship and pure science in the Western world. The progressive spirit inspires the search for new knowledge and its application to human affairs of every kind; and, in order that the application may be made systematically and on a large scale, it leads logically to the introduction of general mass education. Thus the three factors at the root of the coming

crisis in mathematical education are seen to be nothing else than aspects of progressivism.

No nation is more thoroughly imbued with the progressive spirit of Western culture than is our own country. No people is more ready to experiment with innovations, to accept change, or to face the attendant problems than is the American people. The public recognition of the crisis in mathematics- and science-teaching and the public interest in the search for solutions to the problems which are troubling educators concerned with these fields seem to me to reflect the progressive American attitude. The circumstances are favorable to an open-minded consideration of these problems and to the acceptance of the changes involved in trying to solve them.

It is surely easiest to direct attention first to the way in which these problems emerge at the uppermost levels of education. In our universities it has become urgently necessary to extend and diversify instruction in mathematics, without prolonging unduly the periods of study required by our future technologists, scientists, and mathematicians. At the top we must plan to produce more thoroughly trained research workers in all branches of the mathematical sciences, pure mathematics included. The greatest risk we run in our approach to these problems is that of being tempted by what I shall term "the technological fallacy"—the mistaken belief that instruction in mathematics and the natural sciences should be aimed primarily at the satisfaction of the demands of modern technology. History suggests that a healthy technology cannot be maintained without a continual vigorous probing of nature's varied mysteries and a deep desire to understand the intricate workings of nature's laws. One might even say that a reliable measure of the technological vigor of a country is given by the vigor of its mathematical research. It is thus extremely imprudent for any nation to embark upon a program of education which would neglect, hamper, or discourage scientific and mathematical research in its universities. The dangers of such a course are by no means entirely avoided by accepting the compromise which would consist in confining thorough mathematical training to those future research workers deemed to have a par-

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ticularly clear need for it while offering abbreviated, practical instruction to those destined to become technological specialists. This compromise would provide a convenient springboard for gradually reducing support to pure science and at the same time would burden the faculty with an ever multiplying diversity of specialized mathematical courses of a strictly practical character. In fact, one of the subtler forms of the technological fallacy is expressed in the thesis that the mathematics taught to prospective technologists should be adjusted to the special requirements of each branch of technology, corresponding courses in such subjects as algebra, statistics, and the calculus being offered specifically for architects, or engineers, or chemists, or premedical students, or social scientists, and so on.

In my own opinion, the wisest plan is to offer sound basic mathematical instruction for all and to aim at a much more effectively integrated use of basic mathematics in the technical courses offered under the various scientific departments. The basic courses in mathematics should not dwell unduly or prematurely on mathematical and logical niceties, nor should they include any very large amount of material primarily of interest for advanced pure mathematics. Since the central portions of elementary university mathematics are drawn from analytic geometry, the calculus, and modern algebra, it is not difficult to design a satisfactory nucleus of basic courses and to build around it a group of more advanced courses, among which the future specialist may choose according to his needs and his desires. However, it is a good deal harder to bring about the close co-ordination of courses in the various sciences with the basic courses in mathematics. In a rather long university career, I have never seen such co-ordination attempted, let alone achieved. It is not at all unusual for the departments of engineering, physics, chemistry, economics, and so on to lay down certain mathematical prerequisites after quite inadequate consultation, and then to expect the department of mathematics to adjust its curriculum so that their students may meet these requirements without inconvenience. It is, however, altogether too rare for any of these departments to insure thereafter that the mathematical prerequisites are properly reviewed, utilized, and supple-

mented in their own courses. Adequate co-ordination requires close and uninterrupted contact between departments and complete willingness to work toward the unification of the mathematical training given to students under different departments. This is a point which, I believe, deserves special emphasis in any report on current problems of higher mathematical instruction.

Another aspect of university education which must be emphasized is the obligation of the faculties to avoid unnecessarily prolonging the period of study demanded of future technologists, scientists, and mathematicians. The situation in American medicine should serve to warn us of the danger that the period of preparation may become too long. In the United States it is common for a doctor to have lived more than half of his expected life-span before he is ready for the independent practice of medicine. Indeed, the future doctor, after completing four years at the university and four more in medical school, still has to spend a year or two as a hospital intern and, in all probability, a further two years in medical service with the military establishment. It is inevitable that future science students must expect to require more mathematics in their special fields and must devote more time to acquiring the necessary mathematical background. But it behooves us to save them time for what is really essential by eliminating whatever is unnecessary or secondary, by modernizing what we intend to teach, and by improving the effectiveness of our teaching. The most important step in the last direction is to analyze, rearrange, and recast the material which is found to offer the greatest difficulties to our students, until we succeed in presenting it in the terms most suggestive to the intuition. We cannot expect a net saving of time, because we must simultaneously enrich and enlarge our course offerings for undergraduates and postgraduates by the addition of new or expanded treatments of many different topics in pure and applied mathematics. What time we contrive to save for the student can be invested to broaden and deepen his mathematical understanding; and we should continually urge his teachers in other fields to save time for him, too, by making systematic, well-planned



use of the mathematical knowledge and skill he is able to acquire in our classrooms.

At this time I do not wish to elaborate upon the kind of curricular revision implied by the preceding remarks. Nevertheless, it may be useful for me to make a few specific observations illustrative of what I have in mind. In the United States it is a general practice to teach trigonometry and elementary algebra beyond quadratic equations to the first-year university classes, wasting a great deal of the student's time and stifling his native interest in mathematics by drilling him in dull manipulations of little eventual practical use in either pure or applied mathematics. Quite generally, in Europe as well as in America, higher algebra is still taught without benefit of the insights gained in modern approaches to the subject. Our teaching of these parts of mathematics cries out for excision, modernization, and reorganization. Analytic geometry and the calculus are traditional elementary courses in which we can certainly alter some of our traditional teaching practices to great advantage.

For example, in analytic geometry we fail to introduce and utilize the important vector concept, despite the simplifications and the valuable insights which it affords, because we find it difficult to teach. Not only do we thus commit a sin of omission, but we also bring it about that perforce our mathematical students first learn about vectors from clumsy and unsatisfactory treatments essayed by teachers of physics. My own experience suggests that with a little ingenuity and patience the vector concept can be taught effectively and that the students themselves appreciate a good presentation, finding the application of vectors to three-dimensional geometry even more rewarding than that to the plane. Needless to say, the student who acquires an elementary mastery of vectors at the beginning of his analytic geometry course can at once make effective application of them in his elementary physics course. Incidentally, I might remark that, if the discussion of trigonometry can be held off until the geometry of the circle has been discussed by vector methods, the whole subject can be vastly simplified, condensed, and illuminated.

In the calculus, likewise, a careful analysis will disclose the advantages to be reaped by abandoning or altering some of the tradition-hallowed ways of treating the subject. If the mean-value theorem is developed early and given the central role it deserves, it becomes possible to simplify and to motivate more clearly the introduction of the definite integral and the demonstration of Taylor's theorem with remainder. By being somewhat more careful and precise in our use of terminology, we can avoid many bothersome confusions in the minds of our students. For example, the standard use of the terms "integral" and "integration" to refer to two totally distinct concepts (those of the definite integral and the indefinite integral), before any effective connection has been established between the two, virtually guarantees that the student will be confused as to the meaning and significance of the fundamental theorem of the integral calculus. It is easy enough to remedy this particular defect and others like it, but it would be a valuable contribution to our elementary teaching to discover and treat them systematically.

Passing on to courses beyond the basic ones, it may be said at once that, in geometry, higher algebra, and mechanics, we need to modernize and expand the material taught; that, in statistics and the mathematics of computation, we need to introduce new courses wherever they do not exist; and that we need to study and reorganize the whole structure of postgraduate instruction in pure mathematics with a view to insuring that the major results of mathematical research over the last fifty years are brought within the reach of candidates for the Master's degree and within the grasp of candidates for the Doctor's degree. Those who venture to take up these tasks must have open minds and a broad knowledge of the present state of mathematics. The tasks themselves are not too difficult; but, as we have learned at the University of Chicago, they must be worked at over a rather long period of time if difficulties and imperfections are to be eliminated. One practical point needs to be appreciated in the consideration of postgraduate mathematical instruction, namely, that under normal circumstances there can be only a limited

number of university centers, even in a very large region like Western Europe or the United States, at which a fully developed postgraduate curriculum and research program can be offered. Accordingly it becomes important in guiding the development of the university system to decide where such centers should be created and where postgraduate instruction in mathematics should be limited to less ambitious goals.

What we can do in the universities has to be based on what is being done, or will be done, in the elementary and secondary schools. It is therefore essential that the schools should give adequate preparation to future university students, as well as that they should train large numbers of students who may have no desire to enter the university. The ideal of universal mass education, therefore, poses the problem of insuring that the interests of the future university student shall not be sacrificed to the requirements of the majority or to a blind attachment to egalitarian principles. The United States has unfortunately been making just this sacrifice for some twenty-five or thirty years and is only now beginning to realize, in some measure, the damage which has been done. Educationally, it is clearly wrong to postpone all serious mathematical training to the university level, as our schools have increasingly tended to do, because so many valuable formative years are thereby lost beyond recall. At the age of twelve or fourteen the young student's aptitude for mathematics is surely as high as it will ever be, and it should be cultivated by suitable mathematical training rather than stifled by neglect. Yet it must be admitted that the provision of such training presents a practical problem difficult for the small isolated school to solve. Perhaps the solution lies in bringing pre-university students from the small schools together in larger central schools with residential facilities. In countries where students habitually leave home at an early age, this solution is the one which is likely to be adopted. The alternative would be to provide the necessary teachers even in the smaller schools, despite the increased cost per student which would have to

be borne by the school system as a whole. This is the course which we have traditionally tried to follow in the United States and the one to which we shall probably adhere in dealing with the problem of strengthening mathematical instruction in our public schools. It is a course which we have adequate means to adopt.

In these remarks we have implied our belief that pre-university students should receive separate training in mathematics. Obviously they should emerge from it with the ability to analyze, attack, and solve problems of reasonable difficulty in algebra and geometry. They should have acquired some feeling for numerical and geometrical magnitudes, some facility in expressing themselves in mathematical terms, and some practice in the art of abstraction. For them mathematics should already be a general demonstrative science rather than a collection of useful rules and formulas. In short, these students should already have been helped to take the great leap from Babylonian to Greek mathematics. In this day and age it may be suggested that, in addition, they should already have learned the rudiments of statistical reasoning—a suggestion which involves some definite innovations in secondary-school mathematics. The feasibility of this important change is clearly indicated by the brilliant college textbook, *Statistics: A New Approach*, by Wallis and Roberts (2). Fortunately one of America's leading statisticians is even now engaged in preparing a textbook suitable for high-school use. In all these subjects, furthermore, students should have learned some of the concepts and insights recognized as important for modern mathematics.

As for the majority of secondary-school students, they have a much greater need than ever before of a good working knowledge of arithmetic, simple algebra, and practical geometry—perhaps also of rudimentary statistical techniques—because these subjects are being used more and more extensively in business and industry as these activities are conducted in technically advanced countries. It is strange and rather puzzling that American educationists have been so slow to understand how urgently the general student needs mathematical

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instruction which will keep pace with the rapidly increasing technological demands of our society. The principle that school mathematics should be confined to "life-situations" has been applied, it seems to me, in a perverted and unrealistic fashion. In fact, an honest, contemporary survey of business and industrial requirements would undoubtedly show that in the United States the general student is almost as badly neglected in terms of his mathematical preparation for a career in business or industry as is the pre-university student for his higher studies in mathematics and the sciences. At this time, when particular attention is being paid to the mathematical preparation of our future scientists, we should therefore try to balance whatever is done for them by an intelligent reappraisal of what is being done for the general student. The aim should be always to teach more mathematics to more students until the point is reached where every young person will learn enough to enjoy an unrestricted choice of a career within the limitations set by his native talents.

In conclusion we may mention still another aspect of secondary-school training in mathematics which deserves more attention than it usually receives. This is the question of continuity of instruction. It seems to me important that the pre-university student in particular should have a continuous experience with mathematics, either pure or applied, throughout his secondary-school career. The alternative, which is generally followed in the United States, is to interrupt mathematical training at certain points, with unfortunate consequences for the student who later has to resume the study of mathematics in the university.

Before leaving university and college education to take up mathematics at the primary level, I feel obliged to add a further and, to my mind, exceedingly important comment. After more than thirty years of teaching undergraduate and graduate students of mathematics, I have been convinced that my country will not rise to a higher level of achievement in science and learning till our American schools and colleges revive the concern they once felt for intellectual standards and intellectual discipline. It is almost heart-

breaking to see in our graduate schools, year after year, eager and capable students paying the price, in loss of time or even in frustration, for their ignorance of what it means to be clear and precise; for their inability to organize and communicate their intuitive ideas; for their lack of the intellectual strength required in undertaking and carrying out the grubby, detailed tasks inseparable from learning and creating in any field of scholarship. If there is any part of the equipment of genius which we could confidently undertake to provide through education, it is the "infinite capacity for taking pains"—and it is precisely this task that is being more and more neglected in our schools and colleges. In the graduate school, unfortunately, it is already too late to repair the consequences of this neglect. Something, of course, can be done there to develop the student's capacities for precision, self-expression, and good workmanship; but bad habits and attitudes which have been formed through many years of complacency toward sloppy thinking and mental laziness are nearly impossible to eradicate by the time the student enters the graduate school. The proper place to initiate the teaching of intellectual standards and to commence that discipline of the mind without which it cannot realize its full potentialities is the high-school classroom. I hope the time is coming when we shall realize that it is absurd to relegate all standards of performance and all discipline to the athletic field and the barracks. When that time comes, our teachers can once more undertake the noble mission of teaching their pupils what it means to set themselves high intellectual goals and how essential self-discipline is for achieving them.

What can be done in the secondary schools depends, in turn, upon what is done in the elementary schools. The most significant single observation to be made about elementary-school instruction in mathematics is that it hands over the majority of its pupils to the secondary school with an abiding distrust, even a deeply ingrained fear, of mathematics. Since most human beings take a kind of innate delight in riddles and puzzles of all sorts, the explanation



of this phenomenon must lie not in the nature of mathematics so much as in the manner of its teaching. Without denying the sincerity, ingenuity, or persistence of the efforts made to improve the teaching of elementary-school mathematics, we have to be honest with ourselves and confess that so far we have chalked up a resounding failure. It would be the counsel of despair to urge the postponement to the secondary-school level of all but the barest rudiments of mathematics, in the hope that the problem could be more easily handled there. This step would, at best, merely displace the problem and might, in practice, be found to aggravate it. In any case, the postponement, for other reasons, would surely be even more disastrous than the postponement of the present secondary-school mathematics to the university. On the other hand, there are many promising innovations in the teaching of elementary mathematics, like those successfully introduced by Dr. Catherine Stern (3), in certain American schools, and new psychological insights into the learning process, like those due to Professor Piaget, which may inspire us with lively hopes of succeeding brilliantly where in the past we have failed.

I have no doubt that the key is to be found in a better understanding of the psychology of the child and the adolescent, so difficult for the untrained or unobservant adult to grasp. With a sound knowledge of the pertinent psychological principles, corresponding teaching methods of practical value in the context of mass education can then be developed and elaborated. At the same time the content of elementary-school instruction in mathematics needs to feel the influence of the requirements and insights of modern mathematics. The discovery of conspicuously better teaching methods would inevitably have the added advantage of opening up the possibility of teaching more and more varied mathematics even at the primary level, and the choice among these opportunities should hardly be left to psychological or educational experts ignorant of the nature and uses of modern mathematics. What is indicated in these circumstances is a co-operative study of the elementary-school curriculum by psychol-

ogists, educationists, and mathematicians. I should like to see the universities and the foundations of the United States do their best to promote such a study.

The most obvious suggestion to be made about the elementary-school curriculum in mathematics is that, in addition to arithmetic, it should include a substantial amount of intuitive and practical geometry—a subject which now clearly suffers in many school systems because of its almost total neglect at the elementary-school level. School work intended to stimulate, direct, and develop the child's natural geometrical interests in such a way that his grasp of spatial relations and his ability to express himself in geometrical terms are systematically built up could begin in the early years and would provide a useful basis for later secondary-school work. Perhaps the detailed elaboration of such a program in elementary-school geometry would be a peculiarly appropriate object of co-operative study at this time.

Having discussed in broad terms the problems of mathematical instruction from the top down, we may summarize our views by re-tracing the argument from the bottom up. In my opinion, an ideal system of mathematical instruction would take the child at his entrance into school and give him continuous mathematical training and experience up to the point where it is appropriate and advantageous for him to terminate his mathematical studies, whether this be at the elementary-school, secondary-school, or university level. At the elementary, and to some extent at the secondary, level, instruction should be based on the most skilfully devised pedagogical methods and should be aimed at a good intuitive and practical knowledge of arithmetic, rudimentary algebra, and geometry. This portion of the mathematical curriculum should be designed as an integral part of mass education.

At the secondary level a curricular differentiation should be made between pre-university and terminal students. The pre-university student should receive continuous secondary-school mathematical

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training in algebra, geometry, and the elements of statistical reasoning, designed to give him a fairly high degree of mathematical proficiency within a circumscribed mathematical domain and to enable him to proceed rapidly with further, more exacting mathematical study at the university level. In the university, mathematical instruction should be modernized, enriched, unified, and skilfully graded; but it should avoid the specialization of basic courses for the benefit of specialized groups of students. It should culminate in the strongest possible kind of postgraduate and post-doctoral research activity.

The United States has gone a long way toward the establishment of such a system of mathematical instruction as this, but the goal has not yet been achieved. In my lifetime some of the greatest progress has undoubtedly been made on the university level. The moment now seems to have come when new steps toward our goal can and will be taken on the secondary-school level. These steps will require co-operation and hard work from all those who can contribute toward them as scientists, as teachers, or as citizens. Who would refuse to make the effort, when it means so much to our youth?

#### NOTES

1. See M. H. Stone, "Some Crucial Problems of Mathematical Instruction," in *Report of a Conference on Mathematical Education in South Asia: Held at Tata Institute of Fundamental Research, Bombay on 22-28 February 1956*, with the financial assistance of UNESCO, the International Mathematical Union, the Ministry of Natural Resources and Scientific Research of the Government of India, the Sir Dorabji Tata Trust and the Tata Institute of Fundamental Research, *Mathematics Student*, XXIV (January-April, 1956), 31-43. Bombay 1, India: Tata Institute of Fundamental Research.

2. W. Allen Wallis and Harry V. Roberts, *Statistics: A New Approach*. Glencoe, Illinois: Free Press, 1956.

3. Professor G. Choquet, in a special lecture given at the Bombay Conference on February 26, 1956, described the methods of M. Cuisenaire, which are identical in principle and in most details with those developed independently by Dr. Stern. The materials and manuals for Dr. Stern's methods are available commercially (Boston: Houghton Mifflin Co.) and have been used in many private and public schools in the United States.

## Teachers as a Counter-cyclical Influence

Public school teachers are, in all probability, the largest group who, themselves left behind by industrial advance and the general shortening and lightening of hours, must supply much of the energy for that advance. Teachers are in fact the archetype of those white-collar functionaries who, in helping bring about a society of greater abundance, have their own official and unofficial lives torn and complicated in the process. The teaching function, since it involves the training or guidance of children for an era of abundance, has been extended to include training in group co-operation, manners, the arts, and self-understanding, as well as in large residues of the traditional curriculum. Teachers, therefore, are under growing pressure to provide a happy and rounded atmosphere in the classroom, while they themselves lead lives of harried desperation, not only because of the multiplying demands of the classroom, but because of the many "voluntary" activities expected of them: advising the dramatics or journalism club, consulting with parents, participating in civic and church groups. Many feel they must attend summer school in their "vacations" to acquire needed credits or must earn extra money with summer camps.

Only Pagliacci, the clown, paid to amuse others, is a figure of similar poignancy in the contrast between his public and his private

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face. The public school teacher, usually a woman, must learn accomplished duplicity if she is to cope successfully with her colleagues and supervisors in the system and with the many groups and individuals outside the system for whom she is fair game. And she is fair game because she is harried, female, and charged with reconciling all the divergent aims of the children, the parents, the professional educators, and those to whom teachers pass their charges on for further education or for occupational placement.

These aims are all the more compelling because the school has become, in America, the principal ladder for occupational, social, and economic advance. The school has been such a ladder for a long time in the Old World; but, as a ladder, it served only a few, who made—or, rather, whose parents made for them—an early decision for an academic-professional rather than a trade-school curriculum. In America the school has always been a central channel of mobility. Yet traditionally it was possible (though less so than legend would have it) for especially energetic “self-made” men to rise from the factory workbench or the farm pitchfork without education. Today, save for some opportunities left in small business and other enclaves, the school, with the associated array of student rating-and-dating activities, is the almost undisputed agent for sorting out those who will get ahead, those who will stay in place, and those who will fall. The school is implicated and embroiled in the changing forms of America’s preoccupation with success—the patina of success now being defined by such terms as “group co-operation,” “self-understanding,” “personal adjustment,” and “getting along with people.”

The stepladder role of the school is not direct and unequivocal. One version of the democratic ethos has it that all must get ahead, or be kept back, equally, and the teacher is supposed to distribute her blessings over all her charges. Under new expectations, she must look for and develop qualities other than the patently academic ones. And neither her own feelings nor those of the community will permit her to concentrate on advancing the already scholastically advanced.

All this is complicated, as we shall see, because the teacher is her-

self on the ladder. In her choice of occupation and of niches within that occupation, as in her general style of life, she is anxious to satisfy personal and cultural expectations for advance. At the same time the school systems and the teachers are under increasing pressure to be "democratic." It is hard to think of a public schoolroom in America in which the old Tocquevillian issues of democracy and equality are not being fought over, sometimes rowdily and openly, more often covertly and disingenuously, as the curriculum and the career choices of teachers are shaped to the inconsistent demands of competing pressure groups (among whom the children themselves are not to be thought the least effective). Oppressed from without, and conscience-stricken from within, in the face of broadening responsibilities (often without equally broadening budgets), teachers, like most of us, become bogged down in immediacies and become defensive toward criticism. While preparing children for lives of presumptively increasing abundance and leisure, they lack freedom and leeway to learn what are the long-term trends which victimize them as individuals and minimize their effectiveness.

To be sure, the configuration of competing demands upon the teacher varies considerably despite the omnipresence of the trend to extend the scope of her tasks beyond subject matter to the "total child." The traditions of the particular school system, its leadership at all levels from the school board down, the patterns and the accidents of recruitment—these make for decisive differences among schools.

The harassment of the public school teacher has been traditional in the smaller American communities, but this used to take the form (particularly if the teacher was a woman) of policing her private life, her smoking and gallivanting and her church-going, without much direct interference in her conduct of the classroom. Today, especially in the larger places, the teacher is much freer to lead her own private life, but what we might term her "academic freedom" is under a great deal of pressure. Lack of concern over the teacher's pri-



vate life reflects the general urbanization of America and the decline of puritanical vigilance over teachers, ministers, and other exemplars. Meanwhile, however, concern over the teacher as a person has taken on a new aspect; the teacher is required today to be a "good guy," warm and friendly, not too eccentrically dedicated to interests in which the community cannot share. Moreover, the personality of the teacher has become more closely intertwined with the subjects taught: the high schools, which could remain fairly remote from immediate community preoccupations when attended by only a few, are now under a service-minded pressure to teach the social studies and, in many places, to teach also a kind of syncretistic and neutral religion, as well as to teach tolerance, democracy and citizenship, and all other good things.

Teaching these topics, which contain more obvious dynamite than did the traditional curriculum, both draws on what is in the papers and risks getting into them. High-school teachers can become labeled by their students as "controversial" as soon as any discussion in the social area gets at all heated or comes close to home. While a college student usually has to take the trouble to write home before he can get a parent steamed up about what a teacher has said in class, and is even likely to protect the teacher against his less enlightened parents, the secondary-school student is still living at home with parents whose jealousy of the teacher is not mediated by distance either of space or of status. The high-school teacher has, in fact, lost relative status in recent years as more and more parents are themselves high-school graduates. And while the kindergarten teacher gains admiration because she can control several dozen preliterate whose mothers cannot always manage even one, the high-school teacher of social studies has a harder time being one up on American-born parents, who can claim to know as much as she about civics or UNESCO.

The pioneers of progressive education were, in many cases, courageous people, reformers willing to do battle against the entrenched prejudices and apathies of parents and school administrations and

teachers. Heirs of the Enlightenment, they could believe that, whatever setbacks occurred, the cause of progress would win; and many could also believe that only the stuffy bourgeois stood in their way and that the working class, were it to become educated and informed, would be on their side. Some of them did not live to face the conflicts which have occurred with the immense increase in the proportion of youth who attend high school. Progressive education has, however, turned out to mean quite different things at Putney or Shady Hill Country Day or the Little Red School House and at many city and suburban high schools in middle-class areas throughout the country—schools into which, despite all the wild and absurd attacks on John Dewey, the progressive movement has continued to spread. It has spread, in part because there has been money enough and because the school systems have been large and entrenched enough for some moderate experimentation, but also because it offers the schools a way of appearing up to date and closer to the students' alleged interests, while abandoning subjects like languages and ancient or European history, which reached fewer students but made (when even passably taught) greater demands on those it did reach. In other words, progressive education now serves in many prosperous communities to deprive the more studious of challenges they could well endure and profit from, and to give their teachers a high-minded excuse for being distracted from devotion to their subjects, in exchange for devotion to the cultivating of a harmonious and democratic classroom atmosphere.

One reason for this is that progressive education began, notably in Maria Montessori's work, at the kindergarten and elementary-school level and spread from there into the higher grades. As Lyman Bryson has argued in correspondence, it can be a snare at the higher levels because "it too generously substituted motor thinking, which the child usually loves, for abstract thinking which he has to learn to do," though Bryson agrees that, given the great differences in native endowment, not all teen-agers can and should be made to learn to do abstract thinking.

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While progressivism at its best is still liberating, because it is individuating and compels specific attention to the specific child in the totality of its setting, in a large urban or suburban system a small dose of it is often a way to preclude a larger dose.

Some teachers, to be sure, fight a strong rear-guard action in defense of high intellectual and artistic standards, but others find, in the progressive-education movement, rationalizations for lowering standards and for coming to terms with the general level of inclination in the classroom. In this impact of progressivism, we can see something of a short circuit in the communication of ideas, for, as I have already implied, progressive education in its original impetus was *counter-cyclical*: it was an all-out attack on the Colonel Blimps of the school world, on cruelty and one-sidedness, on uniformity of curriculum and pacing. This attack, though first developed in a few private schools here and abroad, was resisted by the older type of "prep" school, such as St. George's, St. Timothy's, and Rosemary Hall—not to speak of the military schools and the convent schools, some of which aped the worst features of the British public school. Conservative and conventional parents of high status also resisted progressivism, as did many teachers.

In today's situation, however, where the schools and the teachers cannot possibly meet all the demands they put on themselves, I think it would be helpful to develop a systematic theory of education as counter-cyclical. Just as Keynesian economics would have the government and the banks save in a time of inflation and spend in a time of depression, so teachers, in selecting among the expectations held out to them, have some modest opportunities to oppose "life" in its momentary excesses.

A generation or so ago teachers were farsighted in their preoccupation with social skills; and in those many too many areas where underprivileged children still lack access to those skills, it remains important to emphasize them. In fact, to return to our theme at the beginning of the article, where the community continues to be production-

minded, the schools can afford to emphasize the gentler arts of social and personal understanding; even today, the country is undoubtedly overplentifully supplied with sadistic teachers who employ their superiority in subject matter to torment children in the Victorian manner. Such settings, however, would appear to be waning in frequency and impact; as the community becomes more consumption-minded, and as the out-of-school context helps cultivate the children's social skills, humaneness as such may on occasion be given a slightly lower priority in the schools, and an emphasis on the teacher's own production-mindedness—whether with respect to French, football, or mathematics—is likely to be more beneficial and less traumatic. For in the middle-class homes of today children are listened to—they are no longer seen and not heard. The home is itself a “communications laboratory,” at least in the middle class. Children can and do use the movies, television, comics, and magazines like *Seventeen*, as well as each other's example, to learn proper social behavior, especially since they no longer have to do many chores around the house. No one should sneer at the children's social proficiencies: if one compares American young people with their counterparts a generation ago (or in Europe today), one is struck by their poise, with their understanding of themselves, of each other, and of adults; they can often handle touchy questions with a tact and facility our diplomats might well envy. As in the comic strip “Penny,” it is often the adults, not the adolescents, who are awkward. But this very discrepancy leads both parents and teachers, often conscious of their own childhood inadequacies and gaucheries, to give many children what amounts to postgraduate education in sociability when what they need, for the most part, is something very different. What they need, I suggest, is protection for those long-term intellectual and humanistic interests that are momentarily under severe pressure from so many sides.

Counter-cyclical thinking and practice, as is evident, requires that such generalizations be perennially re-examined for accuracy and scope. My own views represent, *inter alia*, the animated revival of

classical and humanistic concerns in the universities and among many businessmen. The "great books," the liberal arts, and similar activities have had the benefit of some energetic polemicists, often quite unafraid to be vulgar in attacking what they deem vulgar in secondary education and vocationalism generally. Sometimes this approach shades over into a new obscurantism which attacks the schools for any interest in the psychology of the learning process, treats John Dewey with condescending unfairness, and insists that there is only one donnish curriculum for everybody. In view of the speed with which, thanks to a resonant communications net, fashions in America change, such incipient cycles must not be overlooked even while one focuses on major national developments.

From this perspective, progressive education was, as I have remarked, undoubtedly a counter-cyclical force a generation ago (as it still is in many "backward" areas and for many individual children). It involved the family in a dialectic which was frequently productive for all members—for the parents, who strove to "keep up," and for the children, who strove to understand and even sympathize with parents. Today, in many of the more prosperous suburbs, it is these children who presently are parents, and whose children are, in turn, attending schools that are no longer bucking the tide, are no longer experimental. No strong disagreements within the family, no tensions between family and school, now require creative resolution. Yet the relaxed adjustment achieved in this way, while in some respects an undeniable advance over earlier miseries, means in terms of the life cycle less variety and less challenge.

This implies that, in many schools where warm and outgoing teachers are present in sufficient number, effort should be directed to seeing that the children have contact with at least one teacher who cares profoundly about a subject matter, like Latin or music, which is at first sight remote from the concerns of everyday life. To be sure, such a teacher need not be indifferent to children. She may well come to be particularly attached to those pupils who are attached to her sub-

ject (as in Mary McCarthy's recent personal memoir). Such a person can do something to set up a competing model to the mediocrity that results from turning a school entirely over to teachers who have been shy and want to be personable and who hence care too much whether the children respond pleasantly to them and to each other. The latter are the teachers who have entered the profession to escape the farm or the working class and who come to be captivated by the paraphernalia of professionalism, such as "teacher talk" about classroom skills and audio-visual aids. If schools were to eliminate the difficult or eccentric teachers who present alternative models of good teaching, they would indeed become like life in 1957, only more so.

For truly high aims, whether they be occupational, personal, or intellectual, tend to contradict life as it is lived in any given place and time. Schools in the past, more by accident and even ignorance than by design, have opened vistas to such aims (for at least a minority) by their very *un-lifelike* character. A student who, through a devoted teacher, could learn to live with Cicero or Mercutio, Joan of Arc or Jane Austen, might well succeed in discovering forms of existence transcending the observable in home or playground.

Is it true, then, that the cultivated and intellectual teacher has lost her role as a model for other teachers? Not completely. Many teachers, whatever their superintendents might sometimes prefer, do not wish to be merely "outgoing." There is the case of one high-school teacher of drama, the daughter of a very cosmopolitan newspaper editor, who after a divorce returned to the city of her birth and started teaching school there (political pull, of the sort now waning, helped her get a certificate). This teacher, traveled and sophisticated, has a remarkable gift for exciting her pupils' interest in the theater; she is proud of her "graduates on Broadway and in Hollywood." But her fellow teachers have grave misgivings about her. They complain that she cares "too much about the drama" and "too little about the children." They complain that her productions demand too much time and effort, that the children who get so enthu-

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siastic about putting on plays have little time for other subjects and for sociability, and they feel that the plays should involve a greater number of the children in their production, even at the cost of making the performances less professional. It would be more democratic, they say, to "give everybody a chance," and the drama, like other activities, is seen as one more way to encourage group participation rather than as a way to encourage vocations in the theater. (The new school principal, a younger man who believes that the duty of the school is to "cultivate the child's total personality," has made life difficult for the drama teacher. What he wants is a good, working team of teachers, not stars on the Broadway firmament—nor excessive demands on the school auditorium.) I suspect, however, that these teachers would be less critical of their colleague, less articulate about her allegedly disproportionate preoccupation with the theater, if they did not themselves, in some degree, aspire to cosmopolitan ways. In taking on responsibility for the child's social and emotional development, they have not wholly relinquished the older responsibility for "culture"; and it is their very ambivalence about partially contending models of teaching that makes them so angry with those teachers, holdovers from an earlier day, who represent not only unequivocally high and secure social status but also the not entirely downgraded status of intellectual discipline and urbanity.

Paradoxically, it is in a non-academic area that the insistence on excellence is already standard. I refer to the sports coach, who is ordinarily expected to get his pupils to do their best (even, sometimes, at shocking cost to the body and soul). In this field, "democracy" means a free way for talent and not, save in a few schools which are hostile to competition as such, that everyone must proceed at a medium pace, or be elected rather than selected for the team. Many of us—forgetting that, before the days of organized sports, our schools and colleges were locales of barely controlled roistering—tend to look down on the coach, though he may today be a better teacher than many of his colleagues by virtue of his more unequivocal aims: the superiority of his pupils is the answer to his prayers. Even while

we moderate his zeal, we might use it as a model for teachers of painting and poetry, some of whom should unquestionably concern themselves with children's self-expression, while others should still concern themselves with giving even the less gifted children the valuable sense that there are cultural continuities and standards of excellence.

Is there any chance for such a program? The same social developments which put brakes on old-fashioned competition have made it possible to recruit a new sort of teacher and school official: a person whose eye is set not on money or social success but on a useful life of service. Perhaps the majority of these end up in private schools; and this will go on as long as, in a great many states, public school teachers most easily win a certificate by attending the teachers' colleges or those university stepchildren, the education departments of state universities. These colleges and departments are not exactly centers of intellectual excitement or cultivation. Inasmuch as well-established private schools can withstand community pressures far better than most public schools, they are better prepared to experiment with counter-cyclical measures. Yet some teachers manage to shuttle between public and private schools, and it makes sense to encourage as many as possible to spend some time in a model school, even if not permanently retained there.

A similar hope guided the Whitney Foundation to invite a group of public high school teachers from different states to spend a year at Columbia or Yale with no assignment to study education but simply to expand their personal, as well as broaden their academic, horizons. (A visit to one of these groups should be required for those laymen or college professors who are unaware of how many enthusiastic and devoted teachers the public school system can still boast.) Not all of today's young people who (as they often put it) want to "work with children" are devoid of interest in a topic which is to be introduced to children. I am told that the Whitney Fellows who have already gone back to their former schools have in many in-

stances taken the leadership in moves to strengthen the humanistic and intellectually challenging elements of the high-school program.

There are other important counter-cyclical possibilities. Chicago research (initiated by Professor Everett C. Hughes) has indicated there are a few schools in slum districts from which teachers do not attempt to flee, even when entitled to by length of service. These turn out to be schools where the principals are of such caliber as to win the devotion of their teachers. As the reputation of such a principal grows, he can even attract teachers to the school. The principal therefore can, if he has talent and character, reverse the usual situation in which the most deprived children are taught either by the most inexperienced or by the most hardened and indifferent teachers. He can, in fact, reverse the vicious circle of mediocrity.

However, such principals are naturally scarce, and great changes in salaries and systems of recruitment are not in prospect. Indeed, I sometimes feel that even well-intended criticism of the schools serves, in the present climate of budget and opinion, only to make school officials and teachers still more nervous and fearful of community pressure than they already are, with inevitably baneful effects on them and on pupils. Must we then look for counter-cyclical measures outside the field of formal education entirely? Counter-cyclical strategy in general must be flexible. And I am inclined to ask, for instance, whether educational television may not provide a new opportunity for reaching children with challenging ideas and cultivated goals, either directly or by tie-in's with other community facilities, such as libraries and museums. It is at least arguable that TV is at present open and experimental in a way that the public schools cannot possibly be—even though, like the schools, it is subject to enormous pressures to be pious and to please everybody.

Even now, however, one finds children for whom the mass media have opened windows, and not only children whose addiction to a monotone of programing has simply made the schools' task appear

more hopeless than heretofore. Keynesian theory leads one always to look for the "multiplier" effect—the relatively small increase in the rate of capital investment that can set off momentous economic dynamisms. In Williamsburg, a New York City slum of a generation ago, the public library served (as Alfred Kazin has poignantly recalled) as a storehouse of excitement for children bored to distraction at the run-down neighborhood school. If one looks at the little blue lights of TV that serve as compensation for an underprivileged existence in Harlem or Chicago's Bronzeville, one cannot help but wonder what chances there are of a child's catching fire from a play, or a poem read aloud, or a concert. Could it be that, just as some TV dramas have followed the movies in making school teachers out to be "good guys" or "pin-up's," the public school teacher who now sees TV as one more enemy may conceivably find her roles clarified and her purposes supported by new images quite beyond the sabotage of the supervisor and the censorship of the school board?

Counter-cyclical strategy, however, is only one aspect of an educational philosophy. Taken alone, it could become (as my colleague, Professor J. W. Getzels, points out) merely the "negation of negation," inherently relativistic and opposing new developments which appear "excessive" although a longer perspective would show them to be fruitful. For counter-cyclical action can do no more than moderate the swings of educational fashion in the *avant-garde* while bringing the rear guard and the home guard a bit nearer to the former. It is forced to take for granted the vested interests, the very vested existence, of the schools, and the prevailing patterns of career choice out of which teachers and scholars arise, while hoping to enlighten in small degree those interests and choices. Like balance-of-power thinking in international and domestic struggles, it may at times be the best we can do, especially in times when fanaticism is a greater danger than stalemate. Yet to a person who imaginatively becomes aware of the enormous waste of talent in our country (or

any country), of the triviality of most academic and school busy work, of the erosion of creativity among both teachers and taught, counter-cyclical action must seem like the merest tinkering.

Thus, perhaps paradoxically, counter-cyclical policy depends for its efficacy on the presence of people in the schools who think otherwise—radical reconstructionists who have a program of their own, not premised on applying or resisting the givens already available. It is not even enough to see to it, great as the advance would be, that schools which now see their function as that of imitating life and preparing for it, take, as the life they have in mind, no mean slice but a wide-angled cosmopolitan orbit. "Life" as now lived anywhere is not good enough, and the schools and those concerned with them can hardly help sharing in the task of inventing versions of urbanism we do not yet have—versions to stand, as art and scientific endeavor do at their best, as projections beyond life rather than reflections and anticipations of it.

## *Changing Values Challenge the Schools*

The central serious issue facing the schools today, as it always has been, is the problem of values. For whatever else the child may be expected to do in school, he is inevitably exposed, explicitly or implicitly, to *some* system of values. And whatever else the child may be expected to learn as he grows up, he inevitably assimilates *some* system of values. Indeed, the nature of his self-identity—his answer to the problem of who he is and where he belongs—depends on the nature of the values he interiorizes. Moreover, whether we will it or not—in fact, whether we know it or not—the choices we teachers and parents make with respect to objectives, curriculum, methods, personnel, and even the buildings we construct, are founded on some system of values, however subliminally these may function in any particular case.

Accordingly, I should like to consider here the following three major issues in the present relationship between our social values and the education of our children: (1) What is the nature of the dominant American value system? (2) What is the nature of the current shifts and cleavages in this value system? (3) What is the effect of these shifts and cleavages on the education of our children?

Let me first define the term "value" as I shall use it here. I borrow the definition from Clyde Kluckhohn: "A value is a conception, explicit or implicit, distinctive of an individual or characteristic of a

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group, of the *desirable* which influences the selection from available modes, means, and ends of actions" (1: 295).

As one looks at Americans from this point of view, we seem in many ways an enigma. As Kaspar Naegele points out, "At one time our values appear obvious and clear cut; at another they are elusive and complicated by many cleavages" (2). One oscillates between the conviction that there is a common value orientation and a common type of America, both of which should not be too difficult to describe, and the doubt as to what indeed is held in common by the Western farmer and the Eastern businessman, the member of the National Association for the Advancement of Colored People in Illinois and the supporter of the White Citizens Protective Council or some such in Alabama, the subscriber to *Fortune* and the reader of *True Romance*. The American foreground is full of contrasts, if not of contradictions. Where, if at all, do the values overlap?

They overlap, at the ideological level, in the American creed. For there is an American creed which has been variously enunciated since Jefferson first wrote it—and this creed constitutes our basic and undivorceable beliefs, our *sacred values*, as Naegele calls them. The present version, formulated by William Tyler Page in 1918, is a moving statement indeed:

I believe in the United States as a government of the people, by the people, for the people, whose just powers are derived from the consent of the governed; a democracy in a republic; a sovereign nation of many sovereign states; a perfect union, one and inseparable, established upon those principles of freedom, equality, justice, and humanity for which American patriots sacrificed their lives and fortunes [3: 287].

This we all believe—or feel it surely as something we ought to believe, even if we do not in actual practice. In a sense, we believe in this creed as we do in the Ten Commandments or the Golden Rule; at the very moment we are departing from it most directly, we would assert we are supporting it most firmly. And just as it is impossible to understand the Judeo-Christian culture in operation by only reading the Bible, so it is impossible to understand the American culture by only knowing the creed. In order to understand our value system in

actual operation, we must first examine the main values supported by the creed and the stresses and strains to which the values are liable.

1. *Democracy*.—As a general value, democracy implies that the experience of the many is more inclusive than the experience of the few, that what people want is what they need, and that the people are the best judge of their needs. It implies further the right to have wrong opinions and the familiar freedoms of speech, press, assemblage, and organization. And yet, as de Tocqueville observed a hundred years ago, and Kluckhohn reiterated within the last ten, the contrast between the principles of democracy and its practice is nowhere as sharp as in certain aspects of our life.

2. *Individualism*.—As a general value, individualism implies that "the individual is the fountain source of energy, initiative, and responsibility in society and has a right to self-expression" (4: 4). This has three major implications: politically, it means subservience of the government to the citizenry; economically, it means free enterprise based on individual risk; morally and religiously, it means that man is a free agent with a right to live his life in his own way. But again, we must remark on the gap between the dream and the deed. We value individualism but fear personal individuality. We value personal initiative but are prone to follow the "man on horseback." We value individual responsibility but insist on social conformity.

3. *Equality*.—Alexis de Tocqueville, among other detached observers, emphasizes equality as perhaps the fundamental American value. He writes:

In America, no one is degraded because he works, for everyone about him works also; nor is any one humiliated by the notion of receiving pay, for the President of the United States also works for pay. He is paid for commanding, other men for obeying orders. In the United States professions are more or less laborious, more or less profitable; but they are never either high or low; every honest calling is honorable [5: II, 185-86].

This is of course an overstatement, but nonetheless equality is one of the values by which we would want to live. Yet as de Tocqueville himself notes, our democratic institutions awaken and foster a pas-

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sion for equality they can never entirely satisfy in practice (5: 1, 255).

4. *Human perfectibility*.—As Naegele states, "To be basically hopeful, because the future counts and the past can be forgotten, even rejected, is defiantly cherished by all of us." Yet this optimism must not be confused with gaiety. America is wryly humorous but fundamentally serious. Our genius is Mark Twain, both of the comic public image and the bitter private beliefs, and Riesman's title *The Lonely Crowd* is not without point here. As Lynd remarks:

The reverse side of the optimistic dream is woven of trouble. This is a thing we don't talk about. . . . A society as determined as ours to be optimistic imposes false faces on all of us. . . . To the greeting "How are you?" the answer must be a confident and hearty "Fine." . . . With us the simple admission of discouragement and a troubled mind is often withheld even from our closest friends. In a culture in which to be unsuccessful means automatically to be in some wise a failure, one tends perforce to struggle with one's black moods alone and unaided [6: vii-viii].

These then, with their stresses and strains, are the abiding sacred values—democracy, individualism, equality, and human perfectibility (or optimism). In addition to these, there have traditionally been a core of existential, operating, or down-to-earth beliefs which constitute our *secular* values.

1. *The work-success ethic*.—Values of *achievement* take precedence over values of *being* (7). Anyone can get to the top if he tries hard enough, and everyone has an obligation to try hard enough to get to the top. To be sure, as Naegele points out, "kindness, forbearance, charity, and compassion" as aspects of what one *is* rather than what one *does* also have a value. But success can excuse one for having intermittently broken the Golden Rule.

2. *Future-time orientation*.—The future, not the past or even the present, is important (7: 149). We must be (and note the vernacular) "forward looking" and "on the go." For what is to come is always bigger and better than what is now. *Time*, therefore, becomes a value in its own right and becomes equated with money (again note the common-sense vernacular: "Time is money"). The present is

undervalued for the sake of the future, and immediate needs must be denied satisfaction for greater satisfactions to come.

3. *Independence, or the autonomous self.*—The self is inviolable and, as such, is of greater ultimate significance than the group. Its independence must be guarded from authority and from bureaucratic interference. Self-determination, self-activity, and self-perfection are the general criteria of personal worth. In accordance with this orientation, mastery becomes a value, and we must master our world both from within and without.

4. *Puritan morality.*—Respectability, thrift, self-denial, hard work, sexual constraint—these are the marks of common decency (7: 149). To be sure, there is the holiday, the opportunity to "blow off steam" and to "have fun." But this is kept outside the values of everyday living. Indeed, for many of us even now, vacation must be rationalized as the replenishment of energy—a good investment, as it were—for the serious and therefore significant things of life. Sociability for the sake of sociability was held to be akin to sloth—and sloth was a sin second only to idolatry.

The sacred creed has remained relatively stable, and democracy, individualism, equality, and human perfectibility as *ideas* are as attractive now as they were 150 years ago. But the traditional operating, or *secular*, values—the work-success ethic, future-time orientation, independence, and Puritan morality—have undergone, and are undergoing, crucial transformation and cleavage as a function of transformation and cleavage in our culture and our social structure. As we asked at the outset, what do the Western farmer and the Eastern businessman, the member of the National Association for the Advancement of Colored People and the supporter of the White Citizens Protective Council, the subscriber to *Fortune* and the reader of *True Romance* have in common? The nature of the question—the very fact that we can ask this question at all—suggests the strains and cleavages to which our values are liable:

1. *Regionalism.*—Regionalism in America is readily observable in

customs, foods, politics, arts, literature, and of course in values. From this point of view we are not so much, as some would have it, a *melting pot* as a *mosaic*. When we go from Maine to Southern California, from Miami to Marblehead, we are not only moving from one place to another but, in good measure, from one way of life to another.

2. *Rural-urban differences*.—The values of the "city slicker" and his "country cousin" are not the same. The farmer is said by Naegele to be typically "individualistic, independent, conservative, mystic, possessed of deep convictions, and fatalistic." The urbanite, in contrast, is said to be "group-oriented, dependent on others, liberal, cynical, superficial, and opportunistic." Of course these are caricatures and, with recent increases in mass communication, probably even less representative than heretofore. Yet traditionally these portraits are not without some verisimilitude in fact.

3. *Social class*.—For such observers as Warner, Davis, and Hollingshead, social class is the major source of differentiation, and probably more has been made of this cleavage in American social structure and its consequence for values than of all others. We need not go into it in any detail here. The data are well established, and I shall do no more than invite you to consider the attitudes existing on the two sides of the track in your community with respect to such values as the work-success ethic, future-time orientation, independence, and what we have called Puritan morality.

Regional, rural-urban, and social-class are not the only cleavages, of course. I might cite, in addition, occupational, ethnic, religious, and other differences, but these are sufficient to illustrate the general point I am making. Our society is discontinuous along many dimensions, and our operating values are equally discontinuous along these dimensions.

4. *Social change*.—Without in any way minimizing the importance of the preceding cleavages, we may suggest that at present the most significant cleavage is the crucial transformation that the dominant values themselves are undergoing. Riesman called our attention to this in his trenchant distinction between our former inner-directed

values and our prevailing other-directed values (8). And more recently, Spindler in a brilliant paper remarked upon this transformation as a change from *traditional* to *emergent* values (7).

Instead of the work-success ethic, there is an overriding value of *sociability* and frictionless interpersonal relations. The hard-working, self-determined Horatio Alger hero as a national model is giving way to the affable young man in the gray flannel suit. Instead of future-time orientation and consequent self-denial, there is a hedonistic *present-time* orientation. "A penny saved is a penny earned" is giving way to "No down payment necessary," and our wealth is measured more by how much we owe than by how much we own. Instead of independence and the autonomous self, there is compliance and *conformity* to the group. As Riesman has observed, we are replacing our inner gyroscope with a built-in radar that alerts us to the feelings of others. The goal of behavior is not rectitude but consensus, not originality but *adjustment*. Instead of Puritan morality, there is a *relativistic moral attitude*—absolutes in right and wrong are questionable. In a sense, morality has become a statistical rather than an ethical concept: morality is what the group thinks is moral.

These conflicting values, these values in flux, are held in various degrees by the different persons in our society and in our schools. The younger teachers are more likely to be emergent in their values than the older teachers, the superintendents and principals more emergent than the parents and public they serve, the parents and public more emergent than the school-board members they select (7: 151). So we have, side by side in the community and in the educational institutions, a kaleidoscope of shifting and confusing, if not absolutely contradictory, assumptions about life and the values that are really ours. For example, to use Lynd's list, we may have the following inconsistencies, or, as we shall call them, *value dilemmas*, competing for the child's attention:

1. Individualism, or "survival of the fittest," is the secret of American greatness, and restrictions on individual freedom are un-American and kill initiative. *But*: No man should live for himself alone; for people ought to stand together and work for common causes.

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2. Religion and "the finer things of life" are our ultimate values and the things all of us are really working for. *But:* A man owes it to himself and to his family to make as much money as he can.

3. Poverty is deplorable and should be abolished. *But:* There never has been enough to go around, and the Bible tells us that "the poor you have always with you."

4. Everyone should try to be successful. *But:* The kind of a person you are is more important than how successful you are.

5. Education is a fine thing. *But:* It is the practical man who gets things done [9: 60-62].

Current misunderstandings and conflicts between public and teachers, school boards and educators, children and parents may be understood in the context of our value dilemmas. Underlying all of these is the radical shift and cleavage in values which we as a people are undergoing. And while we are worrying about motivating our children to acquire an appropriate set of values, the children may properly be asking the prior question: "What values?"

Let me now turn briefly to the effect all of this may have on how the child acquires his value system, especially as it refers to the school situation.

Growing up successfully involves the acquisition of a satisfactory set of values to live by and attaining a stable self-identity. This cannot be left to chance or to time alone; it takes some doing on the child's part and on society's part; for the human organism is not born into the world with a ready-made set of culturally adaptive behavior and values. Instead, he must inevitably learn to put the question to himself: "May I yield to the impulse within me, or will I, by doing so, imperil the highest values of my society?" The child learns, on the one hand, to suppress or to modify certain of his drives. He learns, on the other hand, to acquire certain culturally adaptive attitudes and values. Indeed, one of the functions of the school is to help him do just this.

But the word "learning" or "schooling" is something of a euphemism here, for it is not the same kind of learning as, say, memorizing the multiplication tables, or the capitals of the several states, or the

pledge of allegiance. The child's learning, or, perhaps better here, "interiorizing," of social values is a much more intimate and complex process. Learning, imitation, conscious emulation play a part, to be sure. But as Hutt and Miller, among others, have argued, the fundamental mechanism by which we interiorize values in school as elsewhere is *identification* (10, 11). As the child struggles to integrate a stable self-image from among his piecemeal perceptions of who he is and where he fits, he is led to view himself as at one with another person. He wears daddy's hat and coat, not only to look like daddy, but in some wise to *be* daddy. He helps mother cook and clean, not only to act like mother, but again in some wise to *be* mother. The parents are the child's earliest objects of identification. Later he adds older siblings, favorite neighbors, community heroes, school personnel, and others, not excluding fictional characters. In making these identifications, the child not only assumes the outward trappings and expressive movements of his "significant figures" but attempts also to incorporate their values and attitudes.

It is in this context that the school situation acquires an eminence second only to the home perhaps. To be sure, many aspects of the child's values and personality are already formed by the time he enters school. But the way in which these aspects are developed and modified depends on the character of the educational institution of which he becomes a part. The school personnel become significant figures for the child; they become primary objects of identification (11). And where values are concerned, it is not so much what people *say* the child should do as the kinds of models the significant figures provide that matters. One cannot so much *teach* values as *offer appropriate models for identification*.

When the school is caught in an area of sharp cleavage along regional, occupational, or social-class lines, as so many of our schools are today, or when the school finds itself in a period of rapidly changing values such as we are undergoing now, the various significant figures in the school setting and in the community provide inconsistent and contradictory models for the child (12). In such situations,

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identification, if it occurs at all, results in conflict and anxiety, for to incorporate one model means to reject another (11). To incorporate the parent's values as a model may mean to reject the teacher's values; to accept the teacher's values may mean to reject the community hero's values; to accept the community hero's values may mean to reject the religious leader's values; and so on.

In any event, the child faces an extraordinarily difficult problem in adaptation. The solution may be either inflexible incorporation of one model or renunciation of all models. In one case we have *over-identification* and consequent neurotic restriction; in the other we have *under-identification* and consequent delinquent license. Both represent a serious inadequacy in personal development. Society has failed the child, and the child will one day repay society in kind.

The community and the school must be aware of these complexities in values and the consequences for the child. We cannot merely do nothing, for, if we close the front door to these dilemmas (and they are dilemmas), they will sneak in by the back door. As parents, teachers, and citizens, we need to examine our values—the premises on which we are operating in our child-rearing practices at home and our educational procedures in the school. We must make explicit to ourselves and to our children the objective complexities of our value system. The danger lies not in complexities and differences which are in the open and understood but in complexities and differences which are underground and misunderstood. It is out of communication and understanding of complexities—from free discussion, not denial—that we can provide the child with a realistic model for identification and growth, a model that is consistent with his own personality and the transitory secular and the abiding sacred values of the world of which he is a part.

#### NOTES

1. C. Kluckhohn and Others, "Values and Value-Orientations in the Theory of Action," in *Toward a General Theory of Action*. Edited by T. Parsons and E. A. Shils. Cambridge, Massachusetts: Harvard University Press, 1952.

2. I am indebted for many of the formulations and sources in this article to

Boston University  
School of Education  
Library

an unpublished memorandum on selected studies of American values by Professor Kaspar Naegle, who permitted me to make use of the material here. It is regrettable that this comprehensive and provocative research memorandum has not been published for general reference.

3. *Congressional Record*, Appendix and Index to Parts 1-11 of the Proceedings and Debates of the Second Session of the 65th Congress, Vol. LVI, Part 12. Washington: Government Printing Office, 1918.

4. E. W. Burgess, "Social Planning and the Mores," *Publication of the American Sociological Society*, XXIX (August, 1935), 1-18.

5. A. de Tocqueville, *Democracy in America*, Vols. I and II. Cambridge, Massachusetts: Sever & Francis, 1864.

6. R. S. Lynd, in E. L. Koos, *Families in Trouble*. New York: King's Crown Press, 1946.

7. The classification and analysis of *traditional* and *emergent* values are based in part on G. D. Spindler, "Education in a Transforming American Culture," *Harvard Educational Review*, XXIII (Summer, 1955), 145-53.

8. D. Riesman, *The Lonely Crowd*. New Haven, Connecticut: Yale University Press, 1950.

9. R. S. Lynd, *Knowledge for What?* Princeton, New Jersey: Princeton University Press, 1946.

10. D. R. Miller and M. L. Hutt, "Value Interiorization and Personality Development," *Journal of Social Issues*, V (1949), No. 4, 2-30.

11. M. L. Hutt and D. R. Miller, "Value Interiorization and Democratic Education," *Journal of Social Issues*, V (1949), No. 4, 31-43.

12. A pilot study by the writer of the values and the value dilemmas of a sample of sixty teachers shows, for example, that on Item 2 of Lynd's list of value dilemmas, 66 per cent tended to agree with the first statement, 48 per cent with the second statement, 39 per cent with *both* statements. Again, on Item 3, 75 per cent tended to agree with the first statement, 52 per cent with the second statement, 41 per cent with *both* statements. The question is what happens to the child as he moves from a teacher with one set of values to a teacher with another set of values to a teacher with unresolved conflicts in values. Incidentally, preliminary analysis shows that the value-conflicted teacher—the one who agrees consistently with *both* sides of the inconsistencies—scores higher on the E-F (Authoritarian) Scale than does the teacher who is able to discriminate between the indicated value orientations.

## *Summer Conferences and Workshops at the University of Chicago*

### CONFERENCE ON READING

The twentieth Annual Reading Conference will be held July 1 through July 3, 1957. The central theme will be "Materials for Reading," and attention will be given to both the selection and the use of materials. Sectional programs will consider topics of interest to teachers in elementary schools, secondary schools, and junior colleges. A special section is planned for administrators, supervisors, and reading consultants. Copies of the preliminary program will be available about May 1 from Mrs. Helen M. Robinson, Department of Education.

### WORKSHOP IN READING

A workshop in reading will be held from July 1 through July 26. The workshop is open to classroom teachers, reading consultants, supervisors, administrators, librarians, and remedial teachers. Registration in the workshop is for one and one-half course credit (five semester hours). Additional information and advance registration blanks may be obtained from Mrs. Helen M. Robinson, Department of Education.

### WORKSHOP IN LANGUAGE ARTS IN THE ELEMENTARY SCHOOL

A Workshop in Language Arts in the Elementary School will be held on July 29 through August 16. The workshop, open to classroom teachers, supervisors, and administrators, will consider methods and materials for effecting closer relationships among the language arts of reading, writing, speaking, and listening. Registration in the workshop is for one course credit (three and one-third semester hours). Additional information or application forms for admission may be obtained from Miss Mildred C. Letton, Department of Education.

### CONFERENCE ON GUIDANCE

The Twenty-first Annual Guidance and Personnel Conference will be held on June 27 and 28. The general topic of the conference will be "The Restatement of Guidance Objectives for Educational Institutions." After the first general session, three work groups will consider restatement of guidance objectives (1) in elementary schools, (2) in secondary schools, and (3) in colleges. The work groups will report to the final general session. Questions about the conference should be directed to Robert C. Woellner.

**CONFERENCE ON PROBLEMS OF THE SUPERINTENDENCY**

The Midwest Administration Center and the Department of Education will sponsor a conference from July 24 through July 26 which will focus on the problems of the superintendency. The conference will seek to examine the role and function of the central administrative staff, paying particular attention to superintendent-administrative staff relationships.

In addition to this major summer conference, a number of other conferences will be held during the year. For further details write to Edward H. Gilbert, assistant director, Midwest Administration Center, 5835 Kimbark Avenue, Chicago 37, Illinois.

**WORKSHOP IN PROBLEMS OF TEACHING LITERATURE IN SECONDARY SCHOOLS**

A Workshop in Problems of Teaching Literature in Secondary Schools will be held from July 1 through August 2. This workshop will make a close study of specific texts, followed by discussions centered on special problems brought by members of the class. The work may be taken for graduate credit and will yield three and one-third semester hours of credit. For information write to the Department of English.

**WORKSHOPS ON EVALUATION OF LIBRARY MATERIALS FOR CHILDREN**

The second of three annual workshops on evaluation of library materials for children, to be held on July 31 through August 2, will deal with library materials in the language arts and audio-visual materials and their use. The workshop is open to children's librarians in public libraries and school librarians in elementary and junior high schools. For information write the Graduate Library School.

**WORKSHOP ON CURRICULUM PLANNING**

A workshop for curriculum directors or co-ordinators, chairmen and members of curriculum committees, and persons actively engaged in curriculum planning projects in elementary and secondary schools will be held on July 8 through July 26. Special consideration will be given to applications of groups of persons from the same school system who have responsibility for initiating and guiding curriculum improvement. Dr. Ralph W. Tyler, director of the Center for Advanced Study in the Behavioral Sciences, will be in residence and will devote the major portion of his time to the workshop. Application blanks and additional information may be obtained from M. L. Hartung, Department of Education.



## *The Sniper's Nest*

### WHAT A DIPLOMA SIGNIFIES

Much of the current disappointment with the product of our high schools and colleges arises from the public's assumption that the certificate or diploma awarded for a series of passing marks represents the achievement of a minimum standard of some kind. Something must be wrong, then, if the student cannot compute a percentage, write a simple sentence, or date the War of 1812. A loud cry goes up that our schools and colleges have failed. They have apparently stamped their graduates with a seal of approval similar to the inspection stamp of government-approved beef, but the certified educational product has been found wanting.

Even teachers sometimes fall prey to this misapprehension and talk as if the difficulty they have with a given student arises because the teacher on the preceding rung of the educational ladder "passed" the youth and thus certified his competence to do something he cannot do. We teachers get into this confusion only because we forget what education really is and how we actually arrive at students' marks.

Any teacher planning a unit of work lays out what seems a fair stint for pupils of the maturity and background of those whom he is about to instruct. He prepares a reasonable year's work in Freshman science, Sophomore language, or what you will, knowing that students will differ widely in achievement of the objectives set. When he reads examination papers, looks over his class book, or, in less formal fashion, reviews a given student's progress for the year, he finds that certain students will have a grasp of the kind and amount of material that might be expected at this level, or at least an acceptable approximation of it. Without further thought he awards A's to these students. But unless he is one of those teachers who eventually find that all geese have become swans under their tutelage or unless he has great need for popularity with students, he discovers that those records which indicate this level of competence soon run out. This is not so much because of facts forgotten or individual skills not mastered. Few of us regard education as a process of stuffing the student with hunks of knowledge which he is to regurgitate on an examination. If this were our goal, we could solve our present problem by resolving to try to stuff in fewer isolated facts. The pupil errs, not because he remembers only forty out of one hundred facts, but because of confusions, misunderstandings, and distortions of major educational objectives. These

slips were probably not unnoticed among the A students; but, by the time the B's are reached, the teacher is beginning to sigh a little. Soon even this group runs out.

Then, as the C or other low passing mark is reached, the teacher begins to find that the papers are pushing hard against his conscience. How much aberration can be allowed and the student still be said to have grasped enough so that he does not have to repeat the course or to be denied credit for it? Since most of us do not like to cause unpleasantness and pain and since we are frequently dubious as to how much good further exposure would do some students, we find our consciences becoming very elastic as far as "low pass" is concerned. Yet in most educational situations, C is regarded as the "common," "average," or "usual" grade. But notice how we arrive at it.

We do not pick up the group of "exam" papers and give C to all those that please us, B to those which give us some joy, and A to those that render us ecstatic. No, quite the contrary! Yet the procedure just sketched would be that which we would follow if C did indeed represent a "minimum standard" and marks above C reflected merely additional merit. Most of us like to give high marks. If most pupils performed "satisfactorily" in a course, I think that most marks would be A.

I am not such a curmudgeon as to suggest that we should give C's where we now give A's and then flunk everyone below that point. I suggest only that we be aware, and that we make others aware (parents and the public generally), of what we are now certifying. The high-school and college diploma given to the "average" student does not, in fact, certify that the student knows anything. As things are, such "average" or C performance testifies primarily that the student is confused, bewildered, and completely in error about a large number of things. Consequently let us not be surprised at the obvious and sometimes pitiful shortcomings of high-school and college graduates. The certificate and diploma merely tell us that 80 per cent of them knew relatively little about the high-school or college courses when they took them. After further confusion and forgetfulness have done their work, the already distant approximations to education in every subject become increasingly remote, and no one should be surprised at the seeming lack of learning acquired in school.

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## Educational Writings

### BOOK REVIEW

CHARLES C. COLE, JR., *Encouraging Scientific Talent*. Princeton, New Jersey: College Entrance Examination Board (% Educational Testing Service), 1956. Pp. x+260. \$3.50.

Few public discussions of our time so clearly demonstrate the necessary interlocks between national affairs and educational processes as does the current discussion of supply of scientific and technical personnel. Originated in the United States in 1945 by a report of one of the nation's most distinguished engineers, administrators, and public servants, the discussion has grown in volume and in intensity during the ensuing years; it has now attained the dimensions of a national policy-making debate of first magnitude. The book here under review is an important addition to the debate.

At the close of his service as the wartime director of the Office of Scientific Research and Development, Dr. Vannevar Bush presented the now famous *Science—The Endless Frontier*<sup>1</sup> to President Franklin D. Roosevelt as the formal report of the activities of OSRD. Two years later, in 1947, Bush's report bore its first fruit in a formal statement of government policy. This statement was the Report of the President's Scientific Research Board,<sup>2</sup> now more frequently identified by the name of the Board's chairman as the "Steelman Report."

The central recommendation of the Steelman Report was that there be established a branch of the executive agency of the government, to be devoted to the stimulation and extension of scientific research and development in the United States. In 1950, three years after the Steelman Report appeared, the Congress established the National Science Foundation, whose head, currently Dr. Alan T. Waterman, reports directly to the President of the United States. NSF represents the first formal effort of our nation to provide explicit stimulation for scientific effort, though many government agencies, notably those of the armed services, the health services, and agriculture, have engaged in scientific research and the support of scientific research for many years. Establishment of NSF is a real

<sup>1</sup> Vannevar Bush, *Science—The Endless Frontier*. Washington: Government Printing Office, 1945.

<sup>2</sup> John R. Steelman, *Science and Public Policy: Vol. I, A Program for the Nation*. Washington: Government Printing Office, 1947.

milestone—a marker whose significance on the roadway of Western life cannot be fully determined for years to come. It points up a national commitment to intellectual processes, to economic processes, and to values which can be tested only through the events it helps to bring about. Beyond the milestone there is much new roadway to be built, and the earth-moving machinery can clearly be seen as it goes about its work.

The argument which established NSF exhibited two conspicuous features. One was insistence upon the nation's military dependence upon scientific and technological innovation. The other was insistence upon the basic place of technological innovation in the maintenance of high employment levels in the domestic economy. A somewhat less conspicuous feature was insistence upon the primacy of "pure science" innovation in the processes of technological innovation. Obviously, if these insistences are warranted, the nation should move swiftly to maximize its production of innovators. Those who see the problems of the nation as basically economic and military, and therefore scientific and technological, can be expected to urge that the schools make policy changes which will insure production of increased numbers of individuals with desirable scientific and technical skills.

Both during and after World War II, the national labor surveys have revealed high demand for engineers and scientists. Today's expression of that demand can be seen in the Sunday editions of any of the nation's major newspapers. The high demand, coupled with the arguments of the preceding paragraph, is made urgent by the anxieties produced by our continuing international tensions, and it is the energy source for the maintenance of a high level of public interest and concern with school programs for the development of scientific and technological talent within our population.

The discussion growing out of this concern has become voluminous and complex. Thousands of articles and speeches have been presented to audiences of educators, scientific workers, and the lay public. Governmental agencies, Presidential committees, and numerous non-governmental organizations are now actively engaged in study and action programs dealing with what has come to be called the "problem of scientific and engineering manpower." The activities of twenty-five of these groups have been reported in an important recent survey issued by the Office of Education.<sup>3</sup>

<sup>3</sup> Henry H. Armsby, "Engineering and Scientific Manpower: Organized Efforts To Improve Its Supply and Utilization." United States Office of Education Circular No. 483, August, 1956.

From the welter of educational charge and countercharge, crisis and action, problem and proposed solution, *Encouraging Scientific Talent*, the book under review, selects one category of subjects as its field. This category is that defined roughly by the question: What should be done to "encourage those with high-level ability, particularly those with scientific talent, to enter institutions of higher education and to follow science careers"?

The study draws its data from two sources. (1) an extensive review of pertinent literature and (2) a questionnaire and scholastic-aptitude survey of a carefully constructed sample of high-school Seniors and Sophomores. The work was financed by the National Science Foundation and was carried out by the College Entrance Examination Board; *Encouraging Scientific Talent* is an adaptation of the formal report to NSF. The author, Charles C. Cole, Jr., is assistant dean of Columbia College, Columbia University.

Of the approximately 200 pages of the body of the book, 70 per cent is given to review and discussion of the literature, 15 per cent is given to report and interpretation of the National Study of High School Students and Their Plans, and the remainder is devoted to a discussion of the use of scholarships to encourage the production of scientists and to conclusions and recommendations. In addition to the questionnaire, the appended papers present a proposal for tax revision designed to encourage women to undertake careers, by Allaire U. Karzon, of the law firm of Hodgson, Russ, Andrews, Woods, and Goodyear, of Buffalo; and a discussion of political science, the sciences, and the public service, by Professor Herbert A. Deane, of Columbia University. The book includes an extended classified bibliography and a brief index.

No recent book has done so thorough a job of searching and reporting the literature along a single problem line. The literature report is developed under six topics: "Science and Scientists," "Scientific Ability and Its Identification," "Scientific Ability, Its Supply and Demand," "The Loss of Talent from High School to College," "Deterrents to the Production of Scientists," and "Potential Factors Encouraging Careers in Science." The bibliography and the literature discussion are in themselves sufficient to earn the work a prominent place in policy discussions.

It is this thoroughness, however, which makes one wish that the investigators had included a clear statement of the criteria for their selections, for it is true that, in as variegated a body of literature as the one under view, "the very evidence selected may in itself reflect a particular point

of view" (p. viii). One might add that the selection process may also operate to serve varied and perhaps conflicting points of view. Dean Cole has sought escape from this threat by striving "to separate questions of fact and opinion" and "to express the collective opinion of educators and other specialists and not simply personal whim" (p. viii).

However, careful readers will find it difficult to understand why, for example, when rural areas and small towns are reported as producing far more than their share of scientists, a later section expresses concern over the fact that "half of the top 600,000 school children live in small communities where only one school is available to them and consequently there is little variation possible in the curriculum they must follow." The latter statement is followed by a quotation which asserts: "Even with twice the amount of money now available for high-school support, no school unit of less than 500 students can offer the enriched and flexible program required by the varying interests and abilities of its students, not to mention the enrichment called for to meet the needs of gifted boys and girls" (p. 119).

Other readers will wonder why comments on parental attitudes as determiners of career choices of children, reports of college attendance as a function of family income, and reports of studies of college attendance and test-ability distributions among socioeconomic groups are not regarded as related phenomena.

Again, Anne Roe's provocative work, *The Making of a Scientist*,<sup>4</sup> is extensively cited through early stages of the presentation of the literature, but her most important conclusion was omitted: that there probably are personality syndromes characteristic of successful scientists and that these syndromes probably are different for different scientific fields. Her conclusion, incidentally, is corroborated by George Stern, of Syracuse University, and his colleagues at the University of Chicago,<sup>5</sup> and is further elaborated in Roe's own recent book, *The Psychology of Occupations*.<sup>6</sup> Moreover, Roe's comment that large-volume scholarship support is possibly damaging to student selection and therefore to the production of high-level scientists could have been cited by Cole in his extensive

<sup>4</sup> Anne Roe, *The Making of a Scientist*. New York: Dodd, Mead & Co., 1953.

<sup>5</sup> George C. Stern, Morris I. Stein, and Benjamin S. Bloom, *Methods in Personality Assessment*. Glencoe, Illinois: Free Press, 1956.

<sup>6</sup> Anne Roe, *The Psychology of Occupations*. New York: John Wiley & Sons, Inc., 1956.



argument for federal scholarships, even though the scholarships are proposed for undergraduates.

It is not the intention of this reviewer to present an extended discussion of internal contradictions in the book under review and evidence of needed integration of cited materials. In many of its aspects, Dean Cole's report of the literature raises all the questions of American public education. The survey he provides is as broad and as variegated as the literature it reports, and it nicely vignettes the remarkable complexity and contradictoriness of the public discussion itself.

The second major source of data reported is the National Study of High School Students and Their Plans, which was carried out in the spring of 1955. Its instruments were a thirty-minute questionnaire designed to yield "information on adolescent motivation for college, interest in science, financial plans, and parental backgrounds" (p. 139) and a fifteen-minute test of academic aptitude. These instruments were administered "to the twelfth-grade students enrolled in a 5 per cent sample of the public high schools with Seniors in the United States" (p. 139). A fact sheet for report of community characteristics was completed by principals of the schools, and in every fifth school the instruments were administered to Sophomores.

Many of the conclusions derived from the study will be familiar to students of counseling and student personnel administration, but these data are new, and they also include titillating new items. The familiar fact of low interest in science and engineering on the part of young women receives quantitative description: no more than 1 per cent of the high-ability young women in the sample wished to enter science or engineering. Of the high-ability boys, only about half intended to go to college immediately, and about 57 per cent of those interested in science and engineering had such intentions. Of all those interested in science and engineering, it appears that about 10 per cent would be lost because they could not or would not go to college.

Dean Cole reports an interesting and provocative attempt to discover what effect scholarships might have in dislocating students' choices of college majors. He finds, for example, that half the high scorers who intend (free choice) to study fine arts and education would accept a scholarship to study engineering. Seventy-two per cent of the high scorers who hope to study physical sciences would accept scholarships for engineering. Thirty per cent would leave non-science liberal arts fields for science; 35 per cent would leave social science for physical science. The data show

conclusively that scholarships can seriously dislocate students' life choices, and consequently they point out clearly the possibly enormous public consequences of massive scholarship programs in the sciences and mathematics.

Another interesting point was revealed by a questionnaire item testing students' knowledge of available scholarship programs. When queried about such programs as the Navy ROTC scholarships, the Westinghouse Science Talent Search, and others, only 22 per cent circled more than three. Twenty-four per cent knew of only three, 25 per cent knew of only two, and 20 per cent reported acquaintance with only one. Eight per cent knew of none of the seven scholarship programs listed.

Suitable analysis of the questionnaire data suggests that something between 55,000 and 90,000 able public high-school Seniors could be expected to go to college if financial help were available. ("Able" here means in the upper third on the college-aptitude test, consisting of twenty items carefully selected from the Educational Testing Service files.) To these figures are added extrapolations for private school enrolments, to develop a total national estimate of 60,000-100,000 students in this category.

The 60,000-100,000 students are the concern of an extended argument for a program of government scholarships. Its central theme is:

The ideal science scholarship program would provide for the following things. First, early identification and encouragement of real talent in general, with excellence or potential excellence in mathematics and science as important but not exclusive factors. Second, no restriction on occupational choice as long as the occupation reasonably fitted the scholar's interests and aptitudes. Third, positive, continuing guidance of the talented youth from the tenth-grade level through his college years. Fourth, sizable financial encouragement of the most able when there is a financial need [p. 178].

An ingenious argument supports the view that perhaps 10 per cent of those hopeful of college training in the sciences but blocked by financial need could be reached by scholarships with a possible loss to other fields of 1 per cent or so. For the larger picture:

One hundred thousand scholarships are needed immediately if we are to salvage our loss of talent from high school to college. . . . Government and industry should be partners, co-operating with schools and colleges in a 200 million dollar investment in the nation's intellectual resources [p. 183].

Twenty-five recommendations are presented in the closing discussion, fourteen areas for needed research are outlined. Again, many of the general recommendations are familiar. For example, the schools are urged to

undertake earlier identification of the gifted and to make better provision for their development; guidance programs are to be encouraged; better and more courses in science and mathematics, led by "stimulating, well-paid teachers," are suggested; a "public opinion favorable to the maximum utilization of intellectual powers through an information program that would attempt to dispel the existing apathy and hostility toward intellectual attainment and scientific activity" (p. 186) is also the subject of formal indorsement.

Actually, to this reviewer, much of the effort of *Encouraging Scientific Talent* seems to support more effectively the conclusion of need for better general education in science than the need for improvement of provisions for abler youth. The frequently recurring comment that teachers are underpaid, that our nation exhibits a "cult of material success" which inhibits scientific development and production of scientists, and the like, are merely other ways of stating the last of the general recommendations cited above. This position is clearly stated in this quotation:

Enjoying the fruits of invention and technology to a greater degree than ever before, we have tended to grow more and more suspicious of the men who make that technology possible. Holding the values of a Bachelor's degree higher all the time, we have tended to give less and less concern to what went into the making of that degree. Extending wider and wider the circle of those whom we thought should go to college, we have provided a shrinking share of our national wealth for the welfare of higher education. Becoming more and more dependent on the productivity of our scientific development, we have tended to give less and less attention to science courses in our schools. Placing more and more of a burden for bringing up our youth on the shoulders of the teaching profession, we have continued to provide relatively inferior rewards to those in this occupation [pp. 92-93].

This position amounts to an allegation that the nation's sights are all wrong where science, technology, and intellectual effort generally are concerned; and with this view this reviewer would certainly agree. But better provisions for gifted youth will not straighten the sights—if, indeed, such provisions can be established through public action when the sights are so badly awry. In fact, the situation described above is the principal cause of our current difficulties.

Several assumptions seem to have been operating in the design of the project and of its report, though the assumptions are unstated. Chief among these are three: (1) that the nation's youth is to be managed through the "manpower" concept (that intellects are "resources," to be planned and manipulated as necessary in the national interest); (2) that

public schools and colleges are the appropriate social agencies for developing the kinds of scientific and technological skills now in short supply; (3) that the current demands for scientific and technical personnel are so critical that allocation of available supply should be provided by government action instead of through the market mechanism.

Boulding's crisp denunciation of the Manpower concept<sup>7</sup> receives little more than a perfunctory nod, though it raises a policy question of fundamental importance. Are people ends-in-themselves, or are they "resources," "manpower," "shortages," and "surpluses"? The latter way of thinking receives beautifully clear expression in the statement that, "considering the welfare of the nation as a whole, it would be better to overestimate our demand and underestimate our supply, *because it takes too long to make up a deficit after it has been identified, while a surplus can profitably be put to use in a variety of ways*" (p. 42, italics mine). Spots in the discussion exhibit attempts to return to the solid ground of humanistic and humanitarian concern for the individual; but for this reviewer, at least, the bulk of the discussion seems, unfortunately, to be conducted on the basis of the generalized, collective, dehumanized, economic terms. These, of course, are the terms of most of the current utterances on the subject.

The chief burden of the book is communication of the need for, and of a basis for broad stimulation of, college attendance by able youth. While this position is a compliment to the colleges, have we sufficiently explored the possibilities for other kinds of institutions? Could not industrial training activities take on more of the job of training the technicians and engineers that industry needs? Where shall we get the staff for training the increased numbers of technical people cited in the statistical estimates? Wouldn't we get better scientific production by making it possible for our professors to work with fewer, more highly motivated people than by covering them over with, to follow Miss Roe, forty-hour-per-week scholarship students?

Wolfe's excellent study<sup>8</sup> provides much of the basis of Dean Cole's discussion of the distribution and characteristics of various types of intellectual talent in the nation. In a review of Wolfe's book and in a penetrating

<sup>7</sup> Kenneth E. Boulding, "An Economist's View of the Manpower Concept," in National Manpower Council, *Proceedings of a Conference on the Utilization of Scientific and Professional Manpower Held October 7-11, 1953*, pp. 11-26. New York: Columbia University Press, 1954.

<sup>8</sup> Dael Wolfe, *America's Resources of Specialized Talent*. New York: Harper & Bros., 1954.

article, Thomson<sup>9</sup> raises critical questions concerning policy in the manpower argument—questions which turn on the use of the term “shortage.” Economists do not, apparently, find this a useful term, for it presumes no relation between supply and demand for the items of the “shortage.” The argument for a “shortage” must be translated to mean more demand than can be filled at a given price. The obvious solution is a price rise for the skills in demand, or administrative innovation, rather than a broad-scale government stimulation of college attendance. “Shortage” is a World War II term carried over into peacetime educational planning. Its use in a period of national anxiety, especially in view of its economic inadequacy, obscures the fact that the “shortages” must be calculated in terms of utilization patterns at the time the study is made. The “shortage” of science teachers—or of all teachers, for that matter—presumes continuation of current educational organization and administration. Current “shortages” of engineers presume current utilization patterns for such workers. Obviously, if we could find ways to operate schools effectively with higher average student-teacher ratios, the teacher “shortage” would vanish. If engineers are to be used principally as draftsmen, we shall need many more of them than we need if they are used at the top of their possible performance levels. Thinking in terms of “shortages” may well rob us of the stimulus to improvement in management and administration: if such thinking does drive us to governmentally induced increases in peacetime supply, we shall perhaps fasten today’s administrative practices upon ourselves with shackles of iron.

There is still another deeply rooted shift in values underlying the problems of *Encouraging Scientific Talent*. This is the shift from religion to science for the explanation and treatment of man’s problems. Only a little while ago, as the human race reckons time, a frustrated man knelt to pray for relief of his troubles. Nowadays he tries to establish a research project at the nearest university to deal with his difficulties. Anne Roe states the modern position succinctly:

Man has evolved into what he is and his past is as old as the world. His future is in his own hands, and this has not been true in the same way of any other creature. He has evolved into a responsible being, into one with the power of choice, and this he cannot evade and cannot delegate. . . . His only hope is

<sup>9</sup> a) Procter Thomson, “Manpower Allocation and the Pricing Process,” *Journal of Political Economy*, LXIII (October, 1955), 441–45.

b) Procter Thomson, “Scientific and Technical Manpower: The Economics of the Case,” *Science Teacher*, XXII (September, 1955), 177–78.

to maintain freedom of choice. If he can do this, if he will accept fully what he is, the future will take care of itself [*The Making of a Scientist*, pp. 242-43].

So long as we hold to this view of man, we shall have "shortages" of highly trained people, for we never shall know enough to satisfy our needs. Perhaps we can only hope for wisdom enough to exercise our present freedom of choice in ways which will retain our choice-making areas.

*Encouraging Scientific Talent* is timely and useful. Its literature summary, read with Wolfe, Armsby, Roe, Steelman, Boulding, Thomson, Bush, and Stern (at first blush, a formidable array, but really not too voluminous) will take a newcomer a long way into the current debate over scientific and technical manpower policy. Each reader will need to assess the conclusions and recommendations for himself; after all, these are the things the current discussion is about.

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